

Research Program Abstracts of the
Interagency Energy/Environment R and D Program
Fiscal Year 1977

(U.S.) Environmental Protection Agency
Washington, DC

Aug 79



U.S. Department of Commerce
National Technical Information Service

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BIBLIOGRAPHIC INFORMATION

PB80-159775

Research Program Abstracts of the Interagency
Energy/Environment R and D Program. Fiscal Year 1977.

Aug 79

PERFORMER: Environmental Protection Agency, Washington, DC.
Office of Energy, Minerals and Industry.
EPA-600/9-79-016

See also PB80-159764.

Administered by the Office of Energy, Minerals and Industry within EPA's Office of Research and Development, the Interagency Energy/Environment Program plans, coordinates, and funds research and development on the health and environmental effects and on control technologies related to all forms of energy development. This document contains the project-level descriptions of most of the \$96 million in research and development projects funded by the Interagency Program during FY 1977. The two major sections of this document are (1) Environmental Control Technology and (2) Health and Environmental Effects, which correspond to the two major program research areas. These research sections are further divided into the specific research categories shown below: Control technology--(Fuel processing, preparation, and advanced combustion, Fuel extraction, Environmental impacts of conventional and advanced energy systems, Flue gas sulfur oxide control, Nitrogen oxide control, and Flue gas particulate control); Health and environmental effects--(Ecological effects, Transport an, ...

KEYWORDS: *Pollution control, *Public health,
*Environmental impacts, *Fuel conversion.

Available from the National Technical Information Service,
Springfield, Va. 22161

PRICE CODE: PC A11/MF A01

United States
Environmental Protection
Agency

Research and
Development
Washington, D.C. 20460

EPA 600/9-79-016
August 1979

Energy, Minerals and Industry

PB80-159775



Decision Series



Fiscal Year 1977 Research Program Abstracts

of the
Interagency
Energy/Environment
R&D Program

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SPRINGFIELD, VA. 22161



The Energy/Environment R&D Decision Series

Some of the basic problems facing our society today involve the use of our energy resources and the consequent effects on our environment. These problems affect everyone, and everyone has an interest in their resolution. But the technical aspects of these problems make it difficult for a major portion of the interested public to understand and participate in the decision-making process. This volume contributes to the bridging of this information gap.

The Energy/Environment R&D Decision Series was inaugurated late in 1976. The series presents, in an easily understood and informative manner, selected key issues and findings of the Federal Interagency Energy/Environment Research and Development Program, which was initiated in fiscal year 1975. Planned and coordinated by the Environmental Protection Agency (EPA), the Interagency Program sponsors more than 1,000 research projects ranging from the analysis of health and environmental effects of energy systems to the development of pollution control technologies.

If you have any comments, please write to Editor, RD-681, US EPA, Washington, DC 20460. This document is available through the National Technical Information Service, Springfield, VA 22161. Mention of trade names and commercial products herein does not constitute EPA endorsement or recommendation for use.

All sources contained in this document have been updated and verified as of April 20, 1979. We welcome your suggestions.

Editor: Francine Sakin Jacoff
Design & Text: Peter J. Mavraganis

**Fiscal Year 1977
Research Program
Abstracts
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Interagency
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**United States Environmental Protection Agency
Office of Research and Development
Office of Energy, Minerals and Industry**

August 1979

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Introduction

Administered by the Office of Energy, Minerals and Industry within EPA's Office of Research and Development, the Interagency Energy/Environment Program plans, coordinates, and funds research and development on the health and environmental effects and on control technologies related to all forms of energy development.

This document contains the project-level descriptions of most of the \$96 million in research and development projects funded by the Interagency Program during FY 1977.

The two major sections of this document are (1) Environmental Control Technology and (2) Health and Environmental Effects, which correspond to the two major program research areas. These research sections are further divided into the specific research categories shown below:

Control Technology

- Fuel Processing, Preparation, and Advanced Combustion
- Fuel Extraction
- Environmental Impacts of Conventional and Advanced Energy Systems
- Flue Gas Sulfur Oxide Control
- Nitrogen Oxide Control
- Flue Gas Particulate Control

Health and Environmental Effects

- Ecological Effects
- Transport and Fate
- Measurement Systems and Instrumentation
- Health Effects

Pertinent information contained within each project description includes project title, funding, project officer and affiliation, principal investigator and affiliation, project milestones, and abstract. The project descriptions are obtained by accessing the Office of Research and Development Information System and Project Tracking System (ORDIS/PTS).

One of the main thrusts of the Interagency Program is to improve information transfer between the technical community, decisionmakers, and the public.

In adhering to this policy, this document has been designed to be used with the following three companion documents, each of which highlight different aspects of the program.

Interagency Energy/Environment R&D Program Status Report, EPA-600/9-79-014. This report covers, in executive summary format, the scope of the Interagency Program. Included are descriptions of the program history, current efforts, and future goals and directives.

Who's Who V—Interagency Energy/Environment R&D Program Directory and Index, EPA-600/9-79-017. This directory lists about 500 key Federal officials involved in various fields of energy-related research. *Who's Who V* identifies all R&D areas in the Interagency Program as well as the names, addresses, and phone numbers of the individuals responsible for each project. Through use of this effective reference tool, decisionmakers as well as interested citizens can easily obtain information on any part of the program and related efforts.

Bibliography of the Interagency Energy/Environment R&D Program, EPA-600/9-79-015. This document lists publications resulting from research and development performed under the auspices of the Interagency Program. The listed publications range from the most current research and development and date back to the research projects initiated at the program's inception in 1975.

For FY 1977 the Control Technology portion of the Interagency Program consisted of 61.5 percent of the program budget for a total \$59 million and the Health and Environmental Effects segment contained the remaining 38.5 percent or \$37 million. The following table shows a breakdown of the funding for each specific research category:

Table 1. Funding by Research Category (FY 1977)

CONTROL TECHNOLOGY	
<u>Category</u>	<u>Funding (\$ million)</u>
Fuel Processing, Preparation and Advanced Combustion	19.4
Fuel Extraction	7.1
Environmental Impact of Conventional and Advanced Energy Systems	10.7
Flue Gas Sulfur Oxide Control	11.3
Nitrogen Oxide Control	6.1
Flue Gas Particulate Control	<u>4.4</u>
Total	59.0
HEALTH AND ENVIRONMENTAL EFFECTS	
Ecological Effects	12.0
Transport and Fate	4.0
Measurement Systems and Instrumentation	8.3
Health Effects	<u>12.7</u>
Total	37.0

Table 2 shows total program funding for FY 1977 by participating agency.

Table 2. Funding by Agency (FY 1977)

<u>Agency</u>	<u>Funding (\$ thousand)</u>
EPA	69983
DOE	5196
TVA	4387
NIEHS	3172
NOAA	3153
USDA	2929
FWS	2343
NIOSH	2230
NBS	1072
USGS	989
NASA	<u>546</u>
	96000

Tables 3 and 4 show program funding by research category across agency and by research category across fuel source, respectively.

Table 3. Funding by Research Category Across Agency (FY 1977) (\$ thousand)

	EPA	DOE	TVA	NIEHS	NOAA	USDA	FWS	NIOSH	NBS	USGS	NASA	Total
Control Technology												
Fuel Processing, Preparation and Advanced Combustion	17,290	1,235	880	-	-	-	-	-	-	-	-	19,405
Fuel Extraction	5,980	-	-	-	-	1,120	-	-	-	-	-	7,100
Environmental Impact of Conventional and Advanced Energy Systems	9,776	290	238	-	-	396	-	-	-	-	-	10,700
Flue Gas Sulfur Oxide Control	10,109	-	1,191	-	-	-	-	-	-	-	-	11,300
Nitrogen Oxide Control	5,950	-	150	-	-	-	-	-	-	-	-	6,100
Flue Gas Particulate Control	4,400	-	-	-	-	-	-	-	-	-	-	4,400
Subtotal	53,505	1,525	2,459	-	-	1,516	-	-	-	-	-	59,005
Health and Environmental Effects												
Ecological Effects	4,734	615	1,085	179	1,628	1,413	2,343	-	-	-	-	11,997
Transport and Fate	2,455	470	600	-	475	-	-	-	-	-	-	4,000
Measurement Systems and Instrumentation	3,632	427	243	-	1,050	-	-	341	1,072	989	546	8,300
Health Effects	5,657	2,159	-	2,993	-	-	-	1,889	-	-	-	12,698
Subtotal	16,478	3,671	1,928	3,172	3,153	1,413	2,343	2,230	1,072	989	546	36,995
Program Totals	69,983	5,196	4,387	3,172	3,153	2,929	2,343	2,230	1,072	989	546	96,000

Table 4. Funding by Research Category Across Fuel Source (FY 1977) (\$ thousand)

	Coal	Oil/ Gas	Oil Shale	Nuclear	Geoth.	Solar	Waste- Fuel	Conserve	Multi- Fuel	Total
Control Technology										
Fuel Processing, Preparation and Advanced Combustion	16,665	1,434	906	.	.	.	400	.	.	19,385
Fuel Extraction	4,790	2,110	200	.	.	.	.	.	.	7,100
Environmental Impact of Conventional and Advanced Energy Systems	618	3,045	.	240	375	220	2,850	858	2,494	10,700
Flue Gas Sulfur Oxide Control	11,300	.	.	.	.	.	.	.	.	11,300
Nitrogen Oxide Control	6,100	.	.	.	.	.	.	.	.	6,100
Flue Gas Particulate Control	4,400	.	.	.	.	.	.	.	.	4,400
Subtotal	43,873	6,589	1,106	240	375	220	3,250	858	2,494	59,005
Health and Environmental Effects										
Ecological Effects	6,095	4,857	100	.	.	.	.	.	945	11,997
Transport and Fate	1,056	625	.	44	.	.	.	.	2,275	4,000
Measurements Systems and Instrumentation	3,447	960	175	333	.	.	.	.	3,385	8,300
Health Effects	.	.	.	.	.	.	.	.	12,698	12,698
Subtotal	10,598	6,442	275	377	.	.	.	.	19,303	36,995
Program Total	54,471	13,031	1,381	617	375	220	3,250	858	21,797	96,000

Control Technology

Control Technology Program

The Control Technology Program encompasses six major research areas, each playing an important role in developing an environmentally sound plan for extracting and utilizing our country's energy resources, as well as addressing the probable environmental impacts of emerging energy technologies such as coal gasification and liquefaction, oil shale, and geothermal.

The program is designed to provide information on the types and quantities of pollutants released through extraction and combustion processes, and to develop or stimulate the development of control options where necessary.

The following descriptions of the Control Technology Program component categories explain the research and development ongoing in each section, highlighting typical research.

Fuel Processing, Preparation and Advanced Combustion

This research area involves the development of advanced technologies for fossil fuel processing by providing environmental assessments, bench scale research, technology assessments, and guidance in process control technology.

EPA is working closely with the Department of Energy in examining the environmental impacts of the development and commercialization of fluidized bed combustors, synthetic fuels from coal, oil shale development, and coal cleaning.

In cooperation with the Department of Interior (DOI), EPA has developed several coal cleaning processes, one of which is being demonstrated on a commercial scale at the GPU-PennElectric Power Plant in Homer City, Pennsylvania.

In the area of fluidized bed combustion (FBC), tests on the pressurized FBC miniplant, operated by Exxon in Linden, New Jersey, and tests at EPA's IERL-RTP miniplant point to an optimistic future for FBC combustors, with test results showing major reductions in sulfur dioxide (SO₂) removal and low nitrogen oxide (NO_x) emissions.

In the area of synthetic fuels from coal, an EPA funded synthetic fuels environmental control facility was dedicated at North Carolina State University. Tests have been initiated to evaluate control techniques for the generation of clean gaseous synthetic fuels. In addition, the solvent refined coal (SRC) liquefaction process is being studied.

For oil shale, the methodology and results of sampling and analysis of waste streams at the Paraho oil shale demonstration are being studied and documented.

Fuel Extraction

Research and development in the fuel extraction category is directed toward the prevention, alleviation, and abatement of pollution caused by all forms of fuel extraction and its associated transportation activities.

Through an ambitious cooperative program with the Department of Agriculture, EPA is examining improved methods of reclaiming land disturbed by coal and oil shale strip mining in the eastern and western portions of our country, as well as seeking new methods and providing training courses to combat the problem of acid mine drainage from abandoned mines.

Oil transportation is another main concern of the Interagency Program. The U.S. Coast Guard in concert with EPA and the National Oceanic and Atmospheric Administration has been instrumental in developing techniques for handling oil spills and in documenting oil spill contingency planning.

Environmental Impact of Conventional and Advanced Energy Systems

This program includes environmental assessments of conventional combustion in electric utility and industrial power production, energy conservation, solar energy and geothermal energy systems, and Integrated Technology Assessment.

This research area consists of four subcategories: (1) Waste Heat/Waste Products; (2) Conventional Combustion Environmental Assessment; (3) Conservation and Advanced Systems; and (4) Integrated Technology Assessment.

Waste Heat/Waste Products

The overall objective of this program is the identification, characterization, and assessment of liquid and solid effluents (including waste heat) from electrical generating facilities and development, where appropriate, of control technologies for environmentally sound disposal of these effluents. Specifics include the identification of potential environmental effects to be used as a basis for promulgating EPA effluent guidelines for the industry and for improvement of power plant waste disposal options.

Conventional Combustion Environmental Assessment

The objective of this program is the comprehensive assessment of the environmental, economic, and energy impacts of multimedia emissions of pollutants from stationary, industrial, utility, residential, and commercial conventional combustion processes. These assessments seek to integrate data, which heretofore had been separated into specific environmental efforts (i.e., SO_x and NO_x R&D programs), into a systematic, coordinated environmental assessment structure.

Energy Conservation Methods and Advanced Energy Systems

The general objectives of this program are to develop environmental assessments of energy conservation methods and advanced energy systems and to contribute to the development of pollution control technologies for resource recovery, energy-conserving industrial processes, advanced energy conversion cycles, and advanced energy systems (solar and geothermal energy). Techniques and technologies are under development by the Department of Energy, the Department of Housing and Urban Development, and other agencies including EPA in the resource recovery area. Outputs will support two interagency working groups—the Interagency Task Force on Energy Conservation in Buildings and the Interagency Task Force on Energy Conservation in Industry, as well as EPA regulatory responsibilities, by assuring the environmental compatibility of techniques and technologies in each subject energy area.

Within this program, there are economic, technical, and environmental evaluations of eight resource recovery systems, refuse-derived processing, and energy recovery equipment and systems. These evaluations are assessing the potential for successful, environmentally compatible implementation of the numerous systems being developed by EPA, DOE, and private industry.

Integrated Technology Assessment (ITA)

The overall objective of the ITA program is to identify environmentally, socially, and economically acceptable alternatives for meeting national energy objectives and to assist in the selection of optimum policies for the attainment of associated environmental quality goals.

A noteworthy area of the ITA program is the Ohio River Basin Energy Study (ORBES). This comprehensive study is in the process of defining the social, economic, environmental, institutional and public health impacts of energy development in the Ohio River Basin.

Another important aspect of the program is that it provides the information transfer vehicle for the entire Interagency Program.

In an area as crucial and timely as energy-related environmental research, there are two key communications links which must be formed in order to make our efforts both relevant and more efficient. The first link is within the research community itself, the second is between that community and the policy level decisionmakers and interested public.

Communicating with the research community is the cornerstone of the Interagency Energy/Environment Research and Development Program. Through reports, seminars, and conferences the Interagency Program brings together the key participants in various aspects of energy/environment research and development. Such direct contact is an effective way to coordinate the Federal research effort and to avoid unnecessary duplication of research.

Flue Gas Sulfur Oxide (SO_x) Control

This program develops and evaluates alternative technologies for the removal of sulfur oxide emissions from flue gas at fossil fuel power plants and industrial boilers. The aim of the program is to develop technical data on which to establish emission standards for sulfur-emitting sources. Efforts are underway to evaluate existing sulfur oxide removal installations, to assess other impacts of flue gas desulfurization (FGD) technology, and to assess the applicability of FGD technology to industrial boilers and other sulfur oxide sources.

Major efforts are directed toward FGD technology assessment and development, assessment of the capital and operating costs of FGD systems, research and development on improving FGD systems reliability and capability, and transferring the technological innovations to the public sector.

Nitrogen Oxide (NO_x) Control

This is a program to develop the best practicable combustion technology for the control of NO_x emissions from stationary sources. Stationary source categories include utility boilers, commercial/industrial boilers, residential heating systems, stationary engines, and advanced combustion processes. Advanced combustion processes such as advanced coal burners and coal burner systems are being

studied and fundamental engineering and analytical support studies are also being conducted to evaluate the potential of these advanced methods for NO_x emission control and energy conservation. The research on controlled combustion also includes fuel conditioning for NO_x removal.

Successful conduct of the NO_x control program is crucial because of the alarming projected increase in emissions from stationary sources (primarily the increased combustion of coal) in the next 2 decades.

Flue Gas Particulate Control

This research program identifies and develops practical and effective control technologies for aerosol emissions from manmade sources such as industrial processes and power plants.

Major efforts include assessment of conventional abatement system capabilities (such as electrostatic precipitators, scrubbers, and baghouses), exploration of new control methods, and bench-scale investigation of specific control methods for major problem sources such as low sulfur coal. Such information will be funneled to EPA's standard setting departments for formulating applicable New Source Performance Standards (NSPS).

Fuel Processing, Preparation and Advanced Combustion

****PROJECT: 00307-CONTROL TECHNOLOGY SURVEY OF PARAHO RETORT**

STARTING/ COMPLETION DATE : 07/77 - 11/77 : FUNDING : ESTIMATED - FY77 / \$ 31000
 TASK CODE=B623A-T51 **EPA-68-03-2560 ** (CNTR.) PRIOR FY76 /
 EPA OFFICER.: TJ POWERS EPA/IERL - CINC
 INVESTIGATOR.: J COTTER THOMPSON RAMO WOOLDRIDGE INC
 MILESTONES...: 07/77 -FUNDING PACKAGE SUBMITTED
 07/77 -AWARD FUNDS FOR PROJECT
 08/77 -SAMPLING & ANALYSIS
 11/77 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-000307 SSIE-GMA 4386 EPA -68-03-2560 TASK-B623A-T51
 AP -623A DU -N105 LABT-EMI
 ABSTRACT.....: A TOTAL ENVIRONMENTAL CHARACTERIZATION OF AIR EMISSIONS, LIQUID EFFLUENTS AND SOLID WASTES IS THE
 OBJECTIVE SOUGHT FOR THE PARAHO SURFACE RETORT AT ANVIL POINTS, COLORADO. THERE ARE TWO 2-WEEK
 PERIODS OF SURVEY WHICH WILL OCCUR IN AUGUST 1977 AND SEPTEMBER 1977. THE WORK WILL BE PERFORMED AT
 THE SITE AT THE SAME TIME OTHER EPA, ERDA, AND DOD ENVIRONMENTAL AND PROCESS SAMPLING AND ANALYSIS
 WORK IS IN PROGRESS. THE SAMPLING AND ANALYSIS WILL INCLUDE "ON-SITE" GAS CHROMATOGRAPHY TO MEASURE
 INORGANIC AND LIGHT-END HYDROCARBONS IN RECYCLE GAS STREAMS AS WELL AS ALL PREVIOUS "ON-SITE"
 ANALYSES.

****PROJECT: 00308-ENVIRONMENTAL ASSESSMENT OF OIL SHALE PROCESSES**

STARTING/ COMPLETION DATE : 01/75 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 413000
 TASK CODE=B623A-365 **EPA-68-02-1881 ** (CNTR.) PRIOR FY76 / \$ 872000
 EPA OFFICER.: TJ POWERS EPA/IERL - CINC
 INVESTIGATOR.: J COTTER THOMPSON RAMO WOOLDRIDGE INC
 C PRIEN UNIVERSITY OF DENVER
 MILESTONES...: 01/75 -FUNDING PACKAGE SUBMITTED
 01/76 -AWARD FUNDS FOR PROJECT
 10/76 -FUNDING INCREMENT
 12/76 -FUNDING INCREMENT
 05/78 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-000308 SSIE-GMA 4382 EPA -68-02-1881 TASK-B623A-365
 AP -623A DU -N105 LABT-EMI
 ABSTRACT.....: THE MAJOR OBJECTIVES OF THIS PROJECT INCLUDE THE ACQUISITION OF THE NECESSARY BACKGROUND DATA ON THE
 PRINCIPAL INDUSTRIAL SHALE RECOVERY PROCESSES AND U.S. SHALE RESOURCES. A COMPARATIVE ASSESSMENT OF
 THEIR ENVIRONMENTAL ACCEPTABILITY AND AN EVALUATION OF TECHNOLOGIES AVAILABLE FOR THE CONTROL OF
 AIR, WATER, AND SOLID WASTE EMISSIONS. SHALE OIL PRODUCTION REQUIRES CHEAP, LARGE SCALE MATERIALS
 HANDLING METHODS AT ALL STAGES OF MINING, RETORTING, AND RETORTED SHALE DISPOSAL; MAXIMUM HEAT
 ECONOMY IN RETORTING AND UPGRADING; AND MINIMUM WATER AND POWER CONSUMPTION. A NUMBER OF PROCESSING
 SEQUENCES ARE AVAILABLE, EACH WITH ITS OWN ACCOMPANYING ENVIRONMENTAL IMPACTS. THE EVALUATION AND
 ASSESSMENT PROGRAM INVOLVES SIX TASKS: 1. PROJECT MANAGEMENT; 2. OIL SHALE AND RECOVERY PROCESS
 CHARACTERIZATION; 3. ENGINEERING ANALYSIS AND PROBLEM DEFINITION; 4. FIELD TESTING AND LABORATORY
 ANALYSIS; 5. ENVIRONMENTAL EVALUATION; 6. EVALUATION OF EXISTING ENVIRONMENTAL CONTROL TECHNOLOGY.
 THIS PROJECT WILL PROVIDE A BASIS FOR THE ESTABLISHMENT OF RATIONAL DESIGN, MANAGEMENT, AND
 MONITORING PROCEDURES TO MITIGATE UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS. THE TYPE AND MAGNITUDE
 OF THESE IMPACTS SHOULD BE DETERMINED PRIOR TO THE DEVELOPMENT OF A FULL-SCALE OIL SHALE INDUSTRY.

****PROJECT: 00309-OIL SHALE - SAMPLING AND ANALYSIS REVIEW**

STARTING/ COMPLETION DATE : 05/77 - 07/77 : FUNDING : ESTIMATED - FY77 / \$ 5000
 TASK CODE=B623A-527 **EPA-CA7-2912-A ** (CNTR.) PRIOR FY76 /
 EPA OFFICER.: TJ POWERS EPA/IERL - CINC
 INVESTIGATOR.: J JONES DEV ENGINEERS INC
 MILESTONES...: 03/77 -FUNDING PACKAGE SUBMITTED
 05/77 -AWARD FUNDS FOR PROJECT
 07/77 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-000309 SSIE-GMA 4532 EPA -CA7-2912-A TASK-B623A-527
 AP -623A DU -N105 LABT-EMI
 ABSTRACT.....: A TWO-PHASE EFFORT SHALL BE CONDUCTED BY THE CONTRACTOR. PHASE 1: ANALYSIS OF RESULTS OF SAMPLING
 AND ANALYSIS ACTIVITIES PERFORMED AT PARAHO SITE (ANVIL POINTS, COLORADO) INCLUDES: (A) REVIEW OF
 PROCESS OPERATING PARAMETERS AT TIME OF SAMPLE COLLECTION; AND (B) VERIFICATION OF REASONABLENESS
 OF SAMPLING RESULTS BASED ON (A). PHASE 2: DEVISE PLAN FOR FUTURE SAMPLING REQUIREMENTS AT ANVIL
 POINTS AND SCHEDULE FOR SAME TO ACHIEVE SAMPLING AND ANALYSIS RESULTS REPRESENTATIVE OF
 STEADY-STATE OPERATION OF A PARAHO-TYPE RETORTING PROCESS.

****PROJECT: 00307-CONTROL TECHNOLOGY SURVEY OF PARADO RETORT**

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 TASK CODE=B623A-T51 **EPA=68-03-2560 ** (CNTR.) PRIOR FY76 /

EPA OFFICER.: TJ POWERS EPA/IERL - CINC
 INVESTIGATOR.: J COTTER THOMPSON RAMO WOOLDRIDGE INC

MILESTONES...: 07/77 -FUNDING PACKAGE SUBMITTED
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 11/77 -FINAL REPORT RECEIVED

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MILESTONES...: 01/75 -FUNDING PACKAGE SUBMITTED
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****PROJECT: 00309-OIL SHALE - SAMPLING AND ANALYSIS REVIEW**

STARTING/ COMPLETION DATE : 05/77 - 07/77 : FUNDING : ESTIMATED - FY77 / \$ 5000
 TASK CODE=B623A-527 **EPA=CA7-2912-A ** (CNTR.) PRIOR FY76 /

EPA OFFICER.: TJ POWERS EPA/IERL - CINC
 INVESTIGATOR.: J JONES DEV ENGINEERS INC

MILESTONES...: 03/77 -FUNDING PACKAGE SUBMITTED
 05/77 -AWARD FUNDS FOR PROJECT
 07/77 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: REC-000309 SSIE-GMA 4532 EPA -CA7-2912-A TASK-B623A-527
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: A TWO-PHASE EFFORT SHALL BE CONDUCTED BY THE CONTRACTOR. PHASE 1: ANALYSIS OF RESULTS OF SAMPLING
 AND ANALYSIS ACTIVITIES PERFORMED AT PARADO SITE (ANVIL POINTS, COLORADO) INCLUDES: (A) REVIEW OF
 PROCESS OPERATING PARAMETERS AT TIME OF SAMPLE COLLECTION; AND (B) VERIFICATION OF REASONABLENESS
 OF SAMPLING RESULTS BASED ON (A). PHASE 2: DEVISE PLAN FOR FUTURE SAMPLING REQUIREMENTS AT ANVIL
 POINTS AND SCHEDULE FOR SAME TO ACHIEVE SAMPLING AND ANALYSIS RESULTS REPRESENTATIVE OF
 STEADY-STATE OPERATION OF A PARADO-TYPE RETORTING PROCESS.

****PROJECT: 00310-MACROECONOMIC STUDY - BIOMASS VS. COAL**

STARTING/ COMPLETION DATE : 06/77 - 08/78 : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=B623A-528 **EPA-68-02-2616 ** (CNTR.) PRIOR FY76 /
 EPA OFFICER.: TJ POWERS EPA/IERL - CINC
 INVESTIGATOR.: RT MILLIGAN BECHTEL NATIONAL INC
 MILESTONES...: 04/77 -FUNDING PACKAGE SUBMITTED
 06/77 -AWARD FUNDS FOR PROJECT
 09/78 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-000310 SSIE-GMA 4537 EPA -68-02-2616 TASK-B623A-528
 AP -623A DU -N105 LABT-EMI
 ABSTRACT.....: THE CONTRACTOR IS TO COMPARE MULTIMEDIA ENVIRONMENTAL IMPACTS AND THE COST OF CLEAN ENERGY GENERATION FROM THE PRODUCTION AND UTILIZATION OF SYNTHETIC FUELS FROM BIOMASS, FROM BIOMASS ENERGY CROPS AND FROM COAL. A REPORT ON POLLUTANT EMISSIONS AND CONTROL TECHNOLOGY ASSESSMENT WILL ADDRESS THE ECONOMIC AND ENVIRONMENTAL COMPARISONS OF COAL USE VERSUS SYNTHETIC FUELS FROM BIOMASS VERSUS USING "ENERGY CROPS" DIRECTLY FROM ENERGY GENERATION. CROP TYPES RECEIVING ATTENTION INCLUDE AGRICULTURAL CROPS (MARSH PLANTS, SUGAR CANE, SUGAR BEETS, ETC.) SILVICULTURAL CROPS (VARIOUS HIGH-VOLUME PRODUCTION TREE CROPS, OTHER FOREST MATERIAL, ETC.); AND AQUACULTURAL CROPS (HYACINTH, SEAWEED, ALGAE, KELP, ETC.). IN GENERAL, PROCESSES UNDER DEVELOPMENT IN WASTE-AS-FUEL RESEARCH WILL PROBABLY BE APPLICABLE TO ANY BIOMASS OR BIOMASS-DERIVED FEEDSTOCKS. THEREFORE, THE APPLICABILITY OF EXISTING PROCESSES WILL BE EVALUATED, EMPHASIZING TECHNOLOGY REQUIREMENTS, AND THE COSTS OF POLLUTION CONTROL AND ENERGY PRODUCTION WILL BE COMPARED TO THAT OF COAL.

****PROJECT: 00312-PREPARATION OF PLANS & SPECIFICATIONS FOR MERL/IERL T&E FACILITY**

STARTING/ COMPLETION DATE : 04/77 - 08/77 : FUNDING : ESTIMATED - FY77 / \$ 63000
 TASK CODE=B623A-577 **EPA-68-03-1241 ** (CNTR.) PRIOR FY76 /
 EPA OFFICER.: VF JELEN EPA/IERL - CINC
 INVESTIGATOR.: UNKNOWN MALCOM PIRNIE INC
 MILESTONES...: 03/77 -AWARD CONTRACT
 08/77 -COMPLETE PLANS & SPECS PROVIDED
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-000312 SSIE-GMA 3705 EPA -68-03-1241 TASK-B623A-577
 AP -623A DU -N105 LABT-EMI
 ABSTRACT.....: DEVELOP PLANS & SPECIFICATIONS FOR A MUNICIPAL AND INDUSTRIAL TEST AND EVALUATION FACILITY.

****PROJECT: 00313-ENVIRONMENTAL PROBLEM-SOLVING FOR COMMERCIAL DEVELOPMENT OF OIL SHALE**

STARTING/ COMPLETION DATE : 04/77 - 07/77 : FUNDING : ESTIMATED - FY77 / \$ 10000
 TASK CODE=B623A-595 **EPA-68-03-1250 ** (CNTR.) PRIOR FY76 /
 EPA OFFICER.: TJ POWERS EPA/IERL - CINC
 INVESTIGATOR.: HF COFFER GEO ENERGY CORP
 MILESTONES...: 03/77 -FUNDING PACKAGE SUBMITTED
 04/77 -AWARD FUNDS FOR PROJECT
 12/77 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-000313 SSIE-GMA 4534 EPA -68-03-1250 TASK-B623A-595
 AP -623A DU -N105 LABT-EMI
 ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO RECOMMEND THE RESPECTIVE ROLES OF INDUSTRY AND GOVERNMENT RELATED TO ENVIRONMENTAL POLLUTION PROBLEM-SOLVING ASSOCIATED WITH THE DEVELOPING OIL SHALE INDUSTRY. INDUSTRY REPRESENTATIVES WILL BE SURVEYED TO COLLECT THEIR ATTITUDES REGARDING POTENTIAL JOINT INDUSTRY-GOVERNMENT PROGRAMS RELATED TO POLLUTION CONTROL PROBLEM-SOLVING.

****PROJECT: 00314-MONITORING OF TRACE COMPONENTS FROM THE HANNA IV IN SITU COAL GASIFICATION TEST**

STARTING/ COMPLETION DATE : 07/77 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=B623A-619 **EPA-D7-01185 ** (IAG) PRIOR FY76 /
 EPA OFFICER.: GL HUFFMAN EPA/IERL - CINC
 INVESTIGATOR.: D FISCHER US DOE LARAMIE ENERGY RES CTR
 MILESTONES...: 07/77 -FUNDING PACKAGE SUBMITTED
 07/77 -AWARD FUNDS FOR PROJECT
 07/78 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-000314 SSIE-GMA 3783 EPA -D7-01185 TASK-B623A-619
 AP -623A DU -N105 LABT-EMI
 ABSTRACT.....: THE LINKED VERTICAL WELL IN SITU COAL GASIFICATION PROCESS IS BEING DEVELOPED BY ERDA LARAMIE ENERGY RESEARCH CENTER AT HANNA, WYOMING. THE OBJECTIVE OF THIS RESEARCH WORK IS TO CHARACTERIZE GASEOUS EMISSIONS FOR THIS PROCESS. THE APPROACH CONSISTS OF MONITORING THE LOW BTU GAS DURING THE FULL LIFETIME OF THE HANNA IV IN SITU COAL GASIFICATION TEST TO DETERMINE THE CONCENTRATIONS OF SPECIFIC TRACE COMPONENTS AND THEIR VARIATION AS A FUNCTION OF TIME. CURRENT PLANS ARE TO CONDUCT INVESTIGATIONS BEGINNING SEPTEMBER 1, 1977 AND CONCLUDING ON FEBRUARY 28, 1

****PROJECT: 01411-MINIPLANT STUDIES IN SUPPORT OF THE FLUIDIZED-BED COMBUSTION PROGRAM**

STARTING/ COMPLETION DATE : 01/77 - 02/79 : FUNDING : ESTIMATED - FY77 / \$ 1805500
 TASK CODE=F623A-004 **EPA-68-02-1312 ** (CNTR.) PRIOR FY76 / \$ 5042000

EPA OFFICER.: DB HENSCHEL EPA/IERL - RTP
 INVESTIGATOR.: RR BERTRAND EXXON RESEARCH & ENGINEERING CO
 RC HOKE EXXON RESEARCH & ENGINEERING CO
 MS NUTKIS EXXON RESEARCH & ENGINEERING CO
 LA RUTH EXXON RESEARCH & ENGINEERING CO

MILESTONES....: 11/75 -DEMONSTRATE OPERABILITY OF MINIPLANT WITH 240-HOUR RUN
 12/76 -COMPLETE FIRST PHASE TESTING-SO2 AND NOX EMISSIONS
 08/77 -COMPLETE LEVEL 1 COMPREHENSIVE ANALYSIS ON MINIPLANT COMBUSTOR
 07/78 -COMPLETE FIRST PHASE TESTING OF GRANULAR BED FILTER ON MINIPLANT
 06/82 -COMPLETE ENVIRONMENTAL TESTING ON MINIPLANT COMBUSTOR/REGENERATION

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001411 SSIE-GMA 4162 EPA -68-02-1312 TASK-F623A-004
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: OBJECTIVES: TO CONDUCT COMPREHENSIVE ANALYSIS OF EMISSIONS FROM A PRESSURIZED FLUIDIZED-BED COMBUSTOR, AND TO IDENTIFY THE EFFECTS OF PROCESS OPERATING CONDITIONS ON EMISSIONS; TO STUDY THE POTENTIAL AND ENVIRONMENTAL IMPACT OF SORBENT REGENERATION; AND TO STUDY ADD-ON DEVICES FOR PARTICULATE CONTROL. APPROACH: A 480 LB/HR (218 KG/HR) PRESSURIZED FLUIDIZED-BED COAL COMBUSTION MINIPLANT, AND A 25 LB COAL/HR (13 KG/HR) BENCH-SCALE UNIT, ARE BEING OPERATED. PLANS/PROGRESS: COMPREHENSIVE ANALYSIS OF EMISSIONS FROM THE MINIPLANT COMBUSTOR HAVE BEEN COMPLETED AT ONE SET OF CONDITIONS; FUTURE ANALYSES ARE ALSO PLANNED TO FURTHER DEFINE BEST TECHNOLOGY. A 100-HOUR MINIPLANT COMBUSTION/REGENERATION DEMONSTRATION RUN HAS BEEN COMPLETED; FURTHER SHORT-DURATION TESTS ARE PLANNED. SHAKEDOWN OF A GRANULAR BED FILTER IS UNDERWAY ON THE MINIPLANT TO CONTROL PARTICULATE EMISSIONS AT HIGH TEMPERATURE AND PRESSURE.

****PROJECT: 01412-DEVELOPMENT OF THE CAFB GASIFIER FOR GENERATION OF CLEAN FUEL GAS FOR USE IN AN EXISTING OR NEW COMBUSTOR**

STARTING/ COMPLETION DATE : 05/76 - 05/79 : FUNDING : ESTIMATED - FY77 / \$ 450000
 TASK CODE=F623A-006 **EPA-68-02-2159 ** (CNTR.) PRIOR FY76 / \$ 529000

EPA OFFICER.: SL RAKES EPA/IERL - RTP
 INVESTIGATOR.: M ALPHANDARY ESSO PETROLEUM CO LTD
 GL JONES ESSO PETROLEUM CO LTD
 Z KOWSZUN ESSO PETROLEUM CO LTD
 D LYON ESSO PETROLEUM CO LTD
 G MOSS ESSO PETROLEUM CO LTD
 A RAMSDEN ESSO PETROLEUM CO LTD
 BE RINGROSE ESSO PETROLEUM CO LTD
 AL SAXTON ESSO PETROLEUM CO LTD

MILESTONES....: 08/76 -COMPLETE MINI-RUN ON COAL
 09/77 -REPORT ON MINI-RUN ON COAL
 10/77 -PROVIDE INPUT TO FWEC-OPERATING MANUAL-OIL FEED INPUT
 01/78 -TOPICAL REPORT - SOLID FUELS BATCH TESTS
 05/78 -TOPICAL REPORT - RUN 11 PILOT UNIT
 10/78 -TOPICAL REPORT - RUN 12 PILOT UNIT
 05/79 -TOPICAL REPORT - RUN 13 PILOT UNIT
 03/78 -AID IN START UP DEMONSTRATION UNIT AT LA PALMA

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001412 SSIE-GMA 3351 1 EPA -68-02-2159 TASK-F623A-006
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THE WORK BELOW COVERS ALL ASPECTS OF THE ATMOSPHERIC CAFB DEVELOPMENT PROGRAM REQUIRED TO SUPPORT A FOSTER WHEELER ENERGY CORPORATION DEMONSTRATION OF THE CAFB PROCESS AT THE LA PALMA STATION OF CENTRAL POWER AND LIGHT COMPANY (CPL) IN SAN BENITO, TEXAS, UNDER CONTRACT 68-02-2106. THIS INCLUDES OPERATION OF AN 0.75MWE CHEMICALLY ACTIVE FLUID BED (CAFB) PILOT PLANT IN THREE PERIODS OF EXTENDED DURATION, TO TEST SELECTED DESIGN FEATURES AND MODES OF OPERATION FOR THE 20MW CAFB DEMONSTRATION, PARTICULARLY AS THEY RELATE TO OPERATION ON COAL AND PITCH FUELS, AND BED MATERIALS AVAILABLE FOR THE CPL PLANT. OTHER WORK INVOLVES BATCH GASIFICATION TEST, DEVELOPMENT OF PROCESS FOR REDUCING COAL ASH RETENTION IN THE FLUID BED, AND ASSISTANCE TO FOSTER WHEELER AND CPL IN DEVELOPMENT OF PLANT OPERATIONAL PROCEDURES AND TEST PROGRAMS, AND IN SELECTION OF EQUIPMENT AND MATERIALS FOR HIGH TEMPERATURE FLUID BED OPERATIONS.

****PROJECT: 01413-ENGINEERING SUPPORT OF THE CAFB DEMONSTRATION PLANT PROGRAM**

STARTING/ COMPLETION DATE : 02/76 - 08/78 : FUNDING : ESTIMATED - FY77 / \$ 118000
 TASK CODE=F623A-008 **EPA-68-02-2142 ** (CNTR.) PRIOR FY76 / \$ 481000

EPA OFFICER.: SL RAKES EPA/IERL - RTP
 INVESTIGATOR.: DL KEATNS WESTINGHOUSE ELECTRIC CORP R & D CTR
 MILESTONES...: 03/77 -TOPICAL REPORT ON CANDIDATE STONES, CAFB DEMO
 07/77 -SPENT SORBENT CHARACTERIZATION
 07/77 -MARKET POTENTIAL SPENT SORBENTS DETERMINED
 10/77 -ISSUE ANNUAL REPORT
 10/78 -FINAL REPORT

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: REC-N-001413 SSIE-GMA 4166 EPA -68-02-2142 TASK-F623A-008
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THE CONTRACTOR WILL PERFORM EXPERIMENTAL AND ENGINEERING STUDIES TO SUPPORT THE CAFB DEMONSTRATION PLANT PROGRAM, TO DEVELOP THE FLUIDIZED BED GASIFICATION PROCESS, AND TO PROVIDE PROGRAM ASSISTANCE TO EPA. THE TASKS INCLUDE WORK ON THE HIGH-TEMPERATURE SULFUR REMOVAL SYSTEM, INCLUDING SORBENT SELECTION, SPENT SORBENT PROCESSING, SPENT SORBENT UTILIZATION, AND SPENT SORBENT DISPOSAL; ALTERNATE CONCEPTS, INCLUDING SORBENTS, FUELS, APPLICATIONS, AND PROCESS DESIGN; CONTROL TECHNOLOGY; ENVIRONMENTAL IMPACT; AND SYSTEMS EVALUATION. THE PROGRAM WILL EXTEND PREVIOUS WORK CARRIED OUT BY WESTINGHOUSE IN ALL OF THE AREAS IDENTIFIED. THE PROGRAM WILL DEVELOP DESIGN AND OPERATING DATA, IDENTIFY TEST PROGRAMS, TEST ALTERNATIVE SYSTEM COMPONENTS, PROVIDE TECHNICAL SUPPORT, AND PROVIDE EVALUATION OF TEST DATA.

****PROJECT: 01414-CAFB DEMONSTRATION**

STARTING/ COMPLETION DATE : 06/76 - 03/79 : FUNDING : ESTIMATED - FY77 / \$ 300000
 TASK CODE=F623A-009 **EPA-68-02-2106 ** (CNTR.) PRIOR FY76 / \$ 4055000

EPA OFFICER.: SL RAKES EPA/IERL - RTP
 INVESTIGATOR.: F ZOLDAK FOSTER WHEELER ENERGY CORP
 B HALLIDAY FOSTER WHEELER ENERGY CORP
 E DAMON FOSTER WHEELER ENERGY CORP

MILESTONES...: 12/75 -PRELIMINARY DESIGN MANUAL
 03/75 -PRELIMINARY PROCESS MANUAL
 04/76 -DEFINITIVE DESIGN MANUAL
 06/76 -IDENTIFY PRIMARY SOLID FUEL
 12/76 -IDENTIFY PRIMARY LIQUID FUEL
 12/76 -IDENTIFY PRIMARY BED MATERIAL
 05/77 -START CONSTRUCTION
 01/78 -COMPLETE CONSTRUCTION
 05/78 -START UP
 10/79 -COMPLETE TEST PROGRAM

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: REC-N-001414 SSIE-GMA 4150 EPA -68-02-2106 TASK-F623A-009
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THE OBJECTIVE IS TO DEMONSTRATE, ON A COMMERCIAL SCALE (ABOUT 20 MW), THE CAFB PROCESS AND TO PERFORM ENVIRONMENTAL ASSESSMENT OF THE PROCESS. APPROACH: TASK I - DESIGN PREPARATION AND REVIEW; DESIGN, DEVELOPMENT, FUEL SELECTION, DEFINITIVE DESIGN PROCESS, DESIGN MANUAL. TASK II - CONSTRUCTION PLANNING: SITE PLANNING AND APPROVAL, CONSTRUCTION AND FABRICATION DRAWINGS, CONSTRUCTION PROGRESS. TASK III - EXPERIMENTAL TEST PROGRAM: OPERATING VARIABLES OF PRIMARY FUEL, PERFORMANCE PARAMETERS, OPERATING VARIABLES OF SECONDARY FUELS, OPERATING VARIABLES OF SOLID FUELS. TASK IV - PERFORMANCE AND EMISSION TESTING: RECORDS, BASELINE CORRELATIONS, SPENT MATERIAL STUDIES. TASK V -SYSTEM EVALUATION: PROCESS DESIGN MANUAL UPDATE. TASK VI - REPORTS OF WORK: CONCEPTUAL DESIGN OF COMMERCIAL SYSTEMS (ABOUT 250 MW). OUTPUTS/PROGRESS & PLANS: DEFINITIVE DESIGN REPORT, A PRELIMINARY PROCESS DESIGN MANUAL AND A FINAL REPORT ARE EXPECTED. IN ADDITION, DESIGN DRAWINGS, REPORTS OF RESEARCH AND OPERATING REPORTS ARE EXPECTED. A CONCEPTUAL DESIGN FOR A 250 MW UNIT WILL BE DEVELOPED.

****PROJECT: 01415-ENVIRONMENTAL ASSESSMENT/SYSTEMS ANALYSIS AND PROGRAM SUPPORT FOR FLUIDIZED-BED COMBUSTION**

STARTING/ COMPLETION DATE : 01/76 - 02/78 : FUNDING : ESTIMATED - FY77 / \$ 294000
 TASK CODE=F623A-01 **EPA-68-02-2138 ** (CNTR.) PRIOR FY76 / \$ 1713000

EPA OFFICER.: DB HENSCHER EPA/IERL - RTP
 INVESTIGATOR.: H NACK BATTELLE MEMORIAL INST
 KS MURTHY BATTELLE MEMORIAL INST
 JM ALLEN BATTELLE MEMORIAL INST

MILESTONES...: 09/76 -COMPLETE INITIAL REVIEW OF AVAILABLE DATA
 10/76 -COMPLETE INITIAL ATTEMPT AT ENVIRONMENTAL GOALS-SETTING (MEG)
 04/77 -COMPLETE LEVEL 1 COMPREHENSIVE ANALYSIS ON 18-INCH MERC UNIT
 06/77 -COMPLETE PREPARATION OF INITIAL POLLUTANT LIST, & PRELIMINARY PRI
 08/77 -COMPLETE LEVEL 1 COMPREHENSIVE ANALYSIS ON MINIPANT
 10/77 -COMPLETE STANDARDS SUPPORT PLAN FOR FLUIDIZED-BED COMBUSTION
 12/77 -COMPLETE SKELETON STANDARDS DEVELOPMENT RESEARCH DATA BASE REPORT

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: REC-N-001415 SSIE-GMA 2749 1 EPA -68-02-2138 TASK-F623A-01
 AP -623A DU -N105 LABT-EMI

ABSTRACT..... OBJECTIVES: TO ESTABLISH ENVIRONMENTAL GOALS FOR THE FLUIDIZED-BED COMBUSTION PROCESS BASED ULTIMATELY ON HEALTH/ECOLOGICAL EFFECTS. TO OBTAIN COMPREHENSIVE ANALYSIS OF EMISSIONS FROM EXISTING FLUIDIZED-BED COMBUSTORS. BY COMPARISON OF GOALS WITH MEASURED EMISSIONS. TO DESIGN A CONTROL TECHNOLOGY PROGRAM TO MEET THE GOALS. APPROACH: PAPER STUDIES. DATA EVALUATION WILL DEVELOP HEALTH/ ECOLOGICAL GOALS. AND WILL ASSESS EXISTING DATA ON EMISSIONS AND CONTROL TECHNOLOGY FOR FLUIDIZED-BED COMBUSTION. COMPREHENSIVE ANALYSES OF EMISSIONS FROM EXISTING FBC UNITS WILL BE CONDUCTED AS SOON AS UNITS ARE AVAILABLE. PLANS/PROGRESS: INITIAL LIST OF POTENTIAL POLLUTANTS OF CONCERN DEVELOPED. WITH PRELIMINARY PRIORITIZATION. HAVE PARTICIPATED IN DEVELOPMENT OF METHODOLOGY FOR ENVIRONMENTAL ASSESSMENT. HAVE COMPLETED INITIAL EMISSION/CONTROL TECHNOLOGY DATA REVIEW. HAVE COMPLETED SAMPLING COMPREHENSIVE ANALYSIS ON TWO EXPERIMENTAL FLUIDIZED COMBUSTION UNITS.

****PROJECT: 01418-ENVIRONMENTAL ASSESSMENT/SYSTEMS ANALYSIS AND PROGRAM SUPPORT FOR FLUIDIZED-BED COMBUSTION**

STARTING/ COMPLETION DATE : 12/77 - 12/81 : FUNDING : ESTIMATED - FY77 / \$ 706000
 TASK CODE=F623A-02 **EPA=68-02-2138 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: DB HENSCHEL EPA/IERL - RTP
 INVESTIGATOR.: UNKNOWN BATTELLE MEMORIAL INST
 MILESTONES.... 02/78 -PREPARE ENVIRONMENTAL ASSESSMENT METHODOLOGY STATUS REPORT
 02/78 -PREPARE FBC ENVIRONMENTAL SCIENCES RESEARCH NEEDS REPORT
 09/78 -COMPLETE INITIAL STANDARDS DEVELOPMENT RESEARCH DATA BASE
 09/79 -PREPARE STANDARDS OF PRACTICE MANUAL FOR ATMOSPHERIC FBC
 06/81 -REVISE ATMOSPHERIC FBC DATA BASE REPORTS AND PRACTICE MAN
 09/81 -PREPARE DATA BASE REPORT AND PRACTICE MANUAL FOR PRESSURIZE
 PLAN ID..... (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES... RECN-001416 SSIE-GMA 4688 EPA -68-02-2138 TASK-F623A-02
 AP -623A DU -N105 LABT-EMI

ABSTRACT..... OBJECTIVES: TO ESTABLISH ENVIRONMENTAL GOALS FOR THE FLUIDIZED-BED COMBUSTION PROCESS BASED ULTIMATELY ON HEALTH/ECOLOGICAL EFFECTS. TO OBTAIN COMPREHENSIVE ANALYSIS OF EMISSIONS FROM EXISTING FLUIDIZED-BED COMBUSTORS. BY COMPARISON OF GOALS WITH MEASURED EMISSIONS. TO DESIGN A CONTROL TECHNOLOGY DEVELOPMENT PROGRAM TO MEET THE GOALS. APPROACH: PAPER STUDIES INVOLVING ANALYSIS/EVALUATION OF AVAILABLE DATA WILL BE EMPLOYED TO DEVELOP ENVIRONMENTAL ASSESSMENT METHODOLOGY. TO ESTABLISH ENVIRONMENTAL GOALS. TO ASSESS AVAILABLE CONTROL TECHNOLOGY. AND TO IDENTIFY OPTIMUM CONTROL TECHNOLOGY COMBINATIONS FOR COST-EFFECTIVE MINIMIZATION OF ENVIRONMENTAL IMPACT. COMPREHENSIVE ANALYSES OF EMISSIONS FROM AVAILABLE FBC UNITS WILL PROVIDE EMISSION DATA. PLANS: AN INITIAL STANDARDS DEVELOPMENT RESEARCH DATA BASE REPORT WILL BE PREPARED VIA THE ABOVE EFFORT AS SOON AS COMPREHENSIVE ANALYSES CAN BE COMPLETED ON THE 30 MW ATMOSPHERIC FBC AT RIVESVILLE. UPDATED RESEARCH DATA BASE REPORTS AND STANDARDS OF PRACTICE MANUALS WILL BE PREPARED FOR ATMOSPHERIC AND PRESSURIZED FBC AS FURTHER DATA

****PROJECT: 01420-NOX EMISSIONS FROM FLUIDIZED COMBUSTION**

STARTING/ COMPLETION DATE : 10/76 - 05/79 : FUNDING : ESTIMATED - FY77 / \$ 150000
 TASK CODE=F623A-05 **EPA=R804978 ** (GRANT) PRIOR FY76 / \$ 100000
 EPA OFFICER.: W STEEN EPA/IERL - RTP
 INVESTIGATOR.: JM BEER MIT
 MILESTONES.... 04/77 -INSTALLATION OF 7.5 CM BATCH TYPE COMBUSTOR
 09/77 -DESIGN AND INSTALLATION OF 30 X 30 CM AFB AND SAMPLING TRAIN
 10/78 -DESIGN AND CONSTRUCT 10 CM PFB
 04/79 -COMPLETE DATA ANALYSIS
 05/79 -COMPLETE MATHEMATICAL MODEL DEVELOPMENT
 PLAN ID..... (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES... RECN-001420 SSIE-GMA 3458 EPA -R804978 TASK-F623A-05
 AP -623A DU -N105 LABT-EMI

ABSTRACT..... OBJECTIVES OF THE PROGRAM ARE: 1. TO DEVELOP A MECHANISTIC MATHEMATICAL MODEL FOR THE PREDICTION OF NO EMISSION FROM COAL BURNING FLUIDIZED BEDS. 2. TO PROVIDE PHYSICAL-CHEMICAL INPUT PARAMETERS FOR THE MODEL BY AN EXPERIMENTAL STUDY OF THE NO FORMATION-DESTRUCTION PROCESSES IN FLUIDIZED BEDS. 3. TO GENERATE INFORMATION NECESSARY FOR THE DEVELOPMENT OF NEW CONTROL TECHNOLOGY OF NOX EMISSION BASED ON DETAILED PILOT PLANT SCALE AND BENCH SCALE STUDIES AT BOTH ATMOSPHERIC AND ELEVATED PRESSURE. 4. TO TEST THE MATHEMATICAL MODELS SEVERELY OVER SUFFICIENTLY WIDE RANGES OF OPERATING VARIABLES. APPROACH TO BE USED: THE EXPERIMENTAL STUDY CONSISTS OF TWO PARALLEL INVESTIGATIONS: 1. THE STUDY OF THE NO FORMATION-DESTRUCTION PROCESSES IN CONTINUOUSLY OPERATED FLUIDIZED COMBUSTORS; 2. BATCH TYPE KINETIC STUDIES CARRIED OUT WITH THE 7.5 CM DIA EXTERNALLY HEATED FLUIDIZED BED AND THE 10 CM DIA PFB. IN THE CONTINUOUS FLUIDIZED COMBUSTION EXPERIMENTS THE SPATIAL DISTRIBUTIONS OF THE GASEOUS AND SOLID SPECIES CONCENTRATIONS AND OF TEMPERATURE WILL BE DETERMINED IN THE FLUIDIZED BED AND THE FREEBOARD FOR THE VARIATION OF OPERATIONAL AND DESIGN PARAMETERS. A BATCH TYPE COMBUSTOR WILL BE USED TO INVESTIGATE THE CHAR OXIDATION REACTION. THE EXPERIMENTAL DATA FROM THE CONTINUOUS COMBUSTOR AND THE BATCH COMBUSTOR WILL BE USED TO TEST THE MODEL FOR THE FORMATION AND DEFORMATION OF NO IN FLUIDIZED BED COMBUSTORS. EXPECTED OUTPUTS ARE: 1. AN UNDERSTANDING OF THE MECHANISM OF FORMATION AND DESTRUCTION OF "FUEL NO" IN FLUIDIZED BEDS. 2. THE MODEL OF NO EMISSION WILL PROVIDE INFORMATION FOR THE SCALING UP AND FURTHER DEVELOPMENT OF FLUIDIZED COMBUSTION PLANTS.

****PROJECT: 01422-PRELIMINARY ENVIRONMENTAL ASSESSMENT OF CAFB - LIGNITE AND COAL**

STARTING/ COMPLETION DATE : 02/77 - 04/78 : FUNDING : ESTIMATED - FY77 / \$ 110000
 TASK CODE=F623A-07 **EPA-68-02-2632 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: S RAKES EPA/IERL - RTP
 INVESTIGATOR.: AS WERNER G C A CORP
 RM BRADWAY G C A CORP TECH DIV
 MILESTONES.... 01/77 -COMPLETE SITE VISIT SURVEY & PLANNING
 03/77 -SUBMIT SAMPLING PLAN
 03/77 -COMPLETE PRELIMINARY ENGINEERING ANALYSIS
 11/77 -COMPLETE FIELD TESTING
 01/78 -COMPLETE LAB ANALYSES
 02/78 -COMPLETE ENGINEERING ANALYSIS
 04/78 -SUBMIT FINAL REPORT
 PLAN ID..... (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES... RECN-001422 SSIE-GMA 3594 EPA -68-02-2632 TASK-F623A-07
 AP -623A DU -N105 LABT-EMI

ABSTRACT..... OBJECTIVES: THE CHEMICALLY ACTIVE FLUID BED PROCESS (CAFB) IS TO BE EVALUATED TO DETERMINE AIR, WATER AND SOLID EMISSIONS TO THE ENVIRONMENT RESULTING FROM GASIFICATION AND COMBUSTION OF LIGNITE AT THE ESSO RESEARCH CENTRE, ABINGDON (ERCA), ENGLAND. PILOT PLANT. RECOMMENDATIONS WILL BE DEVELOPED FOR CONTROL REQUIREMENTS FOR A DEMONSTRATION PLANT UNDER CONSTRUCTION IN TEXAS. APPROACH: THIS ENVIRONMENTAL ASSESSMENT WILL BE CARRIED OUT ACCORDING TO EPA'S LEVEL I PROCEDURES. AN EXTENSIVE FIELD AND LABORATORY PROGRAM IS PLANNED TO DETERMINE ORGANIC AND INORGANIC EMISSIONS FROM THE STACK, BOILER BLOWDOWN AND SOLID WASTE. THE FIELD MEASUREMENT PROGRAM WILL DETERMINE TOTAL PARTICULATE, PARTICULATE SIZE DISTRIBUTIONS, CO, CO2, O2, C1-C6 HYDROCARBONS, NOX, SO2 AND SO3 FROM THE STACK. IN ADDITION, ALL GAS, PARTICULATE, SOLID AND WATER SAMPLES WILL BE ANALYZED BY GAS CHROMATOGRAPHY, LIQUID CHROMATOGRAPHY, INFRARED SPECTROSCOPY AND LOW RESOLUTION MASS SPECTROMETRY FOR ORGANIC FUNCTIONAL GROUPS. THESE SAMPLES WILL ALSO BE ANALYZED FOR TRACE ELEMENTS BY SPARK SOURCE MASS SPECTROMETRY AND ATOMIC ABSORPTION SPECTROSCOPY. PARTICULATE AND SOLIDS WILL BE ANALYZED BY X-RAY PHOTOELECTRON SPECTROSCOPY (ESCA) FOR SURFACE ELEMENTS AND COMPOUNDS, WITH PARTICULAR ATTENTION PAID TO VANADIUM AND SULFUR SPECIES. CURRENT PLANS AND PROGRESS: THE PILOT PLANT IS SCHEDULED FOR CONTINUOUS OPERATION DURING THE SECOND WEEK IN OCTOBER. THE FIELD PROGRAM WILL TAKE PLACE DURING THIS PERIOD.

****PROJECT: 01425-ENVIRONMENTAL ASSESSMENT/SYSTEMS ANALYSIS UTILIZING RESIDUAL OIL**

STARTING/ COMPLETION DATE : 06/76 - 09/79 : FUNDING : ESTIMATED - FY77 / \$ 250000
 TASK CODE=F623A-10 **EPA-68-02-2155 ** (CNTR.) PRIOR FY76 / \$ 425000
 EPA OFFICER.: SL RAKES EPA/IERL - RTP
 INVESTIGATOR.: MF TYNDALL CATALYTIC INC
 MILESTONES.... 08/76 -SET UP INFORMATION STORAGE AND RETRIEVAL SYSTEM
 11/76 -DEFINE CATEGORIES OF USAGE FOR RESIDUAL AID
 02/77 -SELECT UNITS FOR SAMPLING AND TESTING
 03/77 -MAKE SITE VISIT TO DETERMINE DATA AND DATA GAPS
 08/77 -ISSUE TECHNOLOGY BACKGROUND REPORT
 11/77 -COMPLETE PRELIMINARY PREPARATION FOR SAMPLING - LEVEL 1 & 2
 04/78 -MAKE SAMPLING TRIP
 08/78 -ISSUE EA ANNUAL REPORT
 12/79 -ISSUE STANDARDS OF PRACTICE MANUALS
 PLAN ID..... (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES... RECN-001425 SSIE-GMA 3378 1 EPA -68-02-2155 TASK-F623A-10
 AP -623A DU -N105 LABT-EMI

ABSTRACT..... OBJECTIVES: CATALYTIC, INC. WILL MAKE AN ASSESSMENT OF ALL RESIDUAL FUEL OIL DESULFURIZATION PROCESSES IN ORDER TO DETERMINE THE COSTS AND EFFICIENCIES FOR REDUCTION OF POLLUTION. APPROACH: THE STUDY WILL START WITH A LITERATURE SEARCH OF ALL COMMERCIAL PROCESSES NOW IN OPERATION AND THOSE WHICH MAY BE PLACED IN OPERATION DURING THE NEXT THREE YEARS. THE COMMERCIAL PROCESSES TO BE STUDIED ARE PARTIAL OXIDATION, HYDRODESULFURIZATION AND FLUE GAS SCRUBBING. DEMONSTRATION PLANTS WILL THEN BE STUDIED INCLUDING THE CHEMICALLY ACTIVE FLUID BED PROCESS (CAFB). THE STUDY WILL INCLUDE ONLY PRODUCTION OF FUEL FOR BOILERS, PIPELINE GAS AND COMBINED CYCLE TURBINES. CURRENT PLANS: A REVIEW AND ANALYSIS OF ALL ENVIRONMENTAL DATA, INCLUDING HEALTH ASPECTS HAS BEEN MADE FOR EACH PROCESS. THIS WILL BE FOLLOWED BY PLANT TESTING. THE ANALYSIS WILL INCLUDE SULFUR COMPOUNDS, NOX, PARTICULATES, TRACE ELEMENTS, CO, HYDROCARBONS AND CARCINOGENIC COMPOUNDS.

****PROJECT: 01428-HAZARDOUS SUBSTANCES IN RESIDUAL OIL**

STARTING/ COMPLETION DATE : 05/77 - 05/79 : FUNDING : ESTIMATED - FY77 / \$ 106000
 TASK CODE=F623A-11 **EPA-68-02-2638 ** (CNTR.) PRIOR FY76 / \$ 164000
 EPA OFFICER.: SL RAKES EPA/IERL - RTP R & D CTR
 INVESTIGATOR.: CR WOLFE WESTINGHOUSE ELECTRIC CORP
 MILESTONES....: 07/77 -SUBMIT WORK PLAN
 10/77 -COMPLETE SURVEY AVAILABLE DATA
 11/77 -SAMPLES SELECTED, TEST PLAN COMPLETE
 12/77 -FIRST SAMPLES GROUP ACQUIRED
 03/78 -SAMPLE COLLECTION COMPLETED
 06/79 -ANALYSIS OF SAMPLES COMPLETED
 09/79 -FINAL REPORT ISSUED
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001426 SSIE-GMA 4151 EPA -68-02-2638 TASK-F623A-11
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: OBJECTIVES: THE OBJECTIVES OF THIS PROGRAM ARE TO PROVIDE COMPREHENSIVE CHEMICAL ANALYSES OF UP TO 100 RESIDUAL OIL SAMPLES, ACHIEVING PARTS PER MILLION RESOLUTION WHERE POSSIBLE OF BOTH ORGANIC AND INORGANIC CONSTITUENTS. IN ADDITION, MUTAGENIC TESTING OF SELECTED SAMPLES AND ISOLABLE COMPONENTS OF THE OILS WILL BE PERFORMED. RECOMMENDATIONS WILL BE MADE FOR THE BEST USE OF EACH OF THE VARIOUS RESIDUAL OILS BASED ON AN EVALUATION OF THE POTENTIAL ENVIRONMENTAL PROBLEMS SEEN AS A RESULT OF THE ANALYSES AND INTERPRETATION OF THE BIOASSAY TESTS. APPROACH: BRIEFLY, THE APPROACH INVOLVES EXTENSIVE USE OF GAS CHROMATOGRAPHY (GC), GC-MASS SPECTROMETRY, INFRARED, RAMAN, FOURIER-TRANSFORM SPECTROSCOPY, LIQUID CHROMATOGRAPHY, DERIVATIVE PREPARATION, AND VARIOUS EXTRACTION PROCEDURES IN ORDER TO ISOLATE AND MEASURE ORGANIC COMPONENTS OF THE OILS. THE INORGANIC ANALYSES WILL BE OBTAINED BY EXTENSIVE USE OF ATOMIC ABSORPTION SPECTROSCOPY, OPTICAL EMISSION SPECTROSCOPY, SPECTROPHOTOMETRY, ELECTROANALYTICAL TECHNIQUES, AND WET CHEMICAL TECHNIQUES. INORGANIC COMPOUND IDENTIFICATION WILL BE ACCOMPLISHED BY UTILIZING INFRARED, X-RAY DIFFRACTION AND AUGER SPECTROSCOPY. PROGRESS/PLANS: THE BIOASSAY TESTING WILL BE ACCOMPLISHED BY A COMBINATION OF SUBCONTRACTS TO LITTON BIONETICS AND STANFORD RESEARCH AND CONCURRENT WORK AT WESTINGHOUSE RESEARCH, E. COLI, SALMONELLA, AND SACCHAROMYCES TEST SYSTEMS WILL BE UTILIZED. THE RADIONUCLIDE ANALYSES WILL BE SUBCONTRACTED TO EBERLINE LABORATORIES OF ALBUQUERQUE, NEW MEXICO. THE ELEMENTAL ANALYSES OF THE MAJOR CONSTITUENTS OF THE OILS WILL BE SUBCONTRACTED TO GALBRAITH LABORATORIES OF KNOXVILLE, TENNESSEE.

****PROJECT: 01428-DESIGN AND CONSTRUCTION OF A FLUIDIZED-BED COAL COMBUSTION SAMPLING AND ANALYTICAL TEST RIG**

STARTING/ COMPLETION DATE : 08/76 - 01/79 : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=F623A-12 **EPA-68-02-2170 ** (CNTR.) PRIOR FY76 / \$ 330000
 EPA OFFICER.: JH WASSER EPA/IERL - RTP AEROTHERM DIV
 INVESTIGATOR.: KJ CLARK ACUREX CORP
 MILESTONES....: 09/76 -PRELIMINARY DESIGN
 02/77 -FINAL DESIGN
 07/77 -INSTALLATION
 09/77 -ACCEPTANCE TEST
 01/78 -FINAL REPORT

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001428 SSIE-GMA 3033 1 EPA -68-02-2170 TASK-F623A-12
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: OBJECTIVE: THE OBJECTIVE OF THE PROJECT IS TO DESIGN, FABRICATE, AND INSTALL IN THE HIGH BAY AREA (WING G) OF THE INDUSTRIAL ENVIRONMENTAL RESEARCH LABORATORY (IERL), A FLUIDIZED BED COMBUSTION SAMPLING AND ANALYTICAL TEST RIG AND AUXILIARY EQUIPMENT THAT SHALL BE USED FOR IERL IN-HOUSE RESEARCH PROGRAMS. THIS TEST RIG IS FUNDAMENTALLY A RESEARCH TOOL. THEREFORE, THE DESIGN PHILOSOPHY UTILIZED SHALL BE BASED ON CONSIDERATIONS OF FLEXIBILITY, ACCURACY, AND UTILITY. APPROACH: THE APPROACH CONSISTS OF DESIGNING A TEST RIG WITH A WIDE RANGE OF SAMPLING ACCESS LOCATION SUITABILITY FOR USE OF ALTERNATIVE SAMPLING AND ANALYTICAL TECHNIQUES, AND TO BUILD THE RIG IN A MODULAR CONFIGURATION TO PERMIT EVALUATION OF ALTERNATIVE CONTROL DEVICES. SPECIFICALLY, THE FBC TEST RIG WILL BE DESIGNED WITH THE FLEXIBILITY TO EVALUATE VARIABLES IN THE SUBSYSTEM: COAL AND SORBENT SYSTEM (BED RATE, INJECTION POINT AND METHOD, TYPE, SIZE); START-UP TECHNIQUE; AIR SYSTEM (FLOW AND FGR RATE, EXCESS AIR); DISTRIBUTION CONFIGURATION; HEAT REMOVAL (BED AND FLUE GAS); BED CONDITIONS (TEMPERATURE, FLUIDIZING VELOCITIES, DEPTH, AREA); FREEBOARD; WASTE SOLIDS. CURRENT PLANS: AEROTHERM WILL DEVISE A CONCEPTUAL DESIGN BASED ON THE RESULTS OF INPUT/OUTPUT DATA GATHERING. A FINAL DESIGN WILL BE COMPLETED AFTER ANALYSIS REVIEW AND APPROVAL OF THE CONCEPTUAL DESIGN. THE TEST RIG WILL THEN BE FABRICATED AND INSTALLED AT THE EPA FACILITY, RESEARCH TRIANGLE PARK, NORTH CAROLINA. ACCEPTANCE TESTING AND PERSONNEL TRAINING WILL BE PERFORMED. AN OPERATING MANUAL AND AS-BUILT DRAWINGS WILL BE DELIVERED.

****PROJECT: 01429-CATALYTIC DESULFURIZATION AND DENITROGENATION**

STARTING/ COMPLETION DATE : 08/75 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 70360
 TASK CODE=F623A-14 **EPA=R804123-03 ** (GRANT) PRIOR FY76 / \$ 91878

EPA OFFICER.: TW PETRIE EPA/IERL - RTP
 INVESTIGATOR.: CN SATTERFIELD MIT
 M MODELL MIT
 JF COCCHETTO MIT

MILESTONES....: 10/75 -REPORT ON HDS OF THIOPHENE AND HDN OF PYRIDINE
 09/76 -REPORT ON EXTENSION TO HIGH PRESSURE OF HDS AND HDN
 09/77 -REPORT ON EXTENSION TO MORE COMPLEX SUBSTANCES
 09/78 -SUMMARY REPORT INCLUDING MODEL OF HDS-HDN INTERACTION

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING

ORDIS CODES...: RECN-001429 SSIE-GMA 4209 EPA -R804123-03 TASK-F623A-14
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: CATALYTIC HYDRODESULFURIZATION (HDS) AND HYDRODENITROGENATION (HDN) REACTIONS FOR THE REMOVAL OF ORGANIC SULFUR AND NITROGEN COMPOUNDS FROM LIQUID FUELS ARE BECOMING INCREASINGLY IMPORTANT AS STRICT SULFUR AND NITROGEN OXIDE EMISSION STANDARDS ARE SET, AND "DIRTIER" OILS DERIVED FROM SHALE AND COAL ATTAIN WIDER USE. A QUANTITATIVE DESCRIPTION OF THE INTERFERENCES BETWEEN THESE TWO REACTIONS, WHICH HAVE ONLY RECENTLY BEGUN TO BE STUDIED, IS NECESSARY FOR OPTIMAL DESIGN OF COMMERCIAL PROCESSING UNITS. TO DATE, WE HAVE STUDIED THIOPHENE, PYRIDINE AND QUINOLINE AS REPRESENTATIVE SULFUR AND NITROGEN COMPOUNDS IN A CONTINUOUS FLOW MICROREACTOR TO MODEL BASIC INTERACTIONS. PYRIDINE INHIBITS THIOPHENE HDS UNDER ALL EXPERIMENTAL CONDITIONS USED. SULFUR COMPOUNDS EXHIBIT A DUAL EFFORT ON THE HDN OF PYRIDINE; A REACTION RATE INHIBITION GIVES WAY TO AN ENHANCEMENT AT MORE SEVERE REACTION CONDITIONS. THEORETICAL CONSIDERATIONS HAVE BEEN PRESENTED TO ACCOUNT FOR EACH OF THESE EFFECTS. REACTIONS OF MORE COMPLEX COMPOUNDS AND THEIR INTERACTIVE REACTION KINETICS ARE CURRENTLY UNDER INVESTIGATION

****PROJECT: 01431-DEMETALLIZATION OF RESIDUAL OILS (PHASE V - DENITROGENATION CATALYST EVALUATION)**

STARTING/ COMPLETION DATE : 12/72 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 91000
 TASK CODE=F623A-16 **EPA=68-02-0293 ** (CNTR.) PRIOR FY76 / \$ 479120

EPA OFFICER.: TW PETRIE EPA/IERL - RTP
 INVESTIGATOR.: CC KANG HYDROCARBON RESEARCH INC
 J GENDLER HYDROCARBON RESEARCH INC
 C WEBER HYDROCARBON RESEARCH INC
 P MARUHNIC HYDROCARBON RESEARCH INC

MILESTONES....: 12/73 -COMPLETED FIRST TEST OF CATALYSTS TO PROMOTE DEMETALLIZATION
 12/74 -FINISHED EXTENDED TEST
 12/75 -FOREIGN RESIDUAL OILS TESTED
 12/76 -WORK WITH RUSSIAN CATALYSTS COMPLETED
 09/77 -OPTIMUM CATALYST IDENTIFIED

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING

ORDIS CODES...: RECN-001431 SSIE-GMA 4187 EPA -68-02-0293 TASK-F623A-16
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: PHASE V OF THIS RESEARCH PROGRAM AIMS TO TEST THE RELATIVE WORTH OF VARIOUS METALS USED IN CURRENT DENITROGENATION CATALYSTS. ANOTHER AIM IS TO EXAMINE THE EFFECT OF INCREASING MACROPORES IN THE CATALYSTS. POSSIBLY, THE EFFECT OF HYDROGEN PARTIAL PRESSURE MAY BE TESTED. INTERACTIONS AMONG THESE VARIABLES ARE OF INTEREST. ESPECIALLY MANUFACTURED CATALYSTS WILL BE USED IN THE SERIES OF EXPERIMENTS WITH COAL LIQUIDS. THE DATA SHOULD HELP IN THE DEVELOPMENT OF MORE EFFECTIVE CATALYSTS TO DENITROGENATE COAL LIQUIDS. COMPLETED PHASES OF THIS PROGRAM HAVE BEEN DESCRIBED IN PREVIOUS NOTICES OF THIS RESEARCH PROJECT.

****PROJECT: 01430-INTERIM SUPPORT FOR HOMER CITY COAL CLEANING DEMONSTRATION**

STARTING/ COMPLETION DATE : 04/77 - 04/78 : FUNDING : ESTIMATED - FY77 / \$ 225000
 TASK CODE=F623A-15 **EPA=68-02-2639 ** (CNTR.) PRIOR FY /

EPA OFFICER.: JP KILGROE EPA/IERL - RTP
 INVESTIGATOR.: LH WEISS CHEMICAL SYSTEMS INC
 JF MCCONNELL CHEMICAL SYSTEMS INC

MILESTONES....: 03/78 -DRAFT REPORT OF INTERIM PREPARATION PLANT TESTS

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING

ORDIS CODES...: RECN-001430 SSIE-GMA 4194 EPA -68-02-2639 TASK-F623A-15
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THIS PROJECT PROVIDES INTERIM SERVICES FOR THE PLANNED COAL CLEANING DEMONSTRATION PROGRAM, WHOSE OVERALL OBJECTIVES ARE TO: QUANTIFY THE PERFORMANCE OF THE SYSTEM AND ITS COMPONENTS AS A MEANS OF CONTROLLING EMISSIONS TO MEET BOTH EXISTING AND NEW SOURCE PERFORMANCE STANDARDS; MEASURE THE EFFECTS OF CLEANED COAL ON ELECTROSTATIC PRECIPITATOR AND BOILER PERFORMANCE AND AVAILABILITY; COMPARE ITS COST EFFECTIVENESS WITH THE ALTERNATIVE OF FLUE GAS DESULFURIZATION; DETERMINE MEANS OF PREDICTING AND CONTROLLING THE CLEANABILITY OF COAL RESERVES; CHARACTERIZE ANCILLIARY ENVIRONMENTAL EFFECTS. THESE INTERIM TASKS ARE: 1. PROVIDE TECHNICAL SUPPORT AND ANALYTICAL SERVICES TO THE HEAVY MEDIUM CYCLONE PILOT PLANT TEST LOOP OPERATED IN CONJUNCTION WITH THE USBM AT BRUCETON, PA.. THROUGH OCTOBER 1977. 2. CONDUCT INITIAL TESTS (MASS, SULFUR, AND ENERGY BALANCES) ON THE INITIAL PORTION OF THE COAL PREPARATION PLANT STARTING UP IN SEPTEMBER 1977. 3. DEVELOP THE OVERALL THREE YEAR DEMONSTRATION PROGRAM PLAN. 4. OBTAIN AND ANALYZE FACE SAMPLES FROM THE HELEN AND HELVETIA MINES FOR EVALUATION OF THE INSEAM VARIATION OF SULFUR AND TRACE ELEMENTS IN THE HOMER CITY COAL RESERVE IN CONJUNCTION WITH THE U.S. GEOLOGICAL SURVEY.

****PROJECT: 01435-CONTROL TECHNOLOGY DEVELOPMENT FOR THE PRODUCTS AND BY-PRODUCTS OF FUEL
CONVERSION/FUEL UTILIZATION SYSTEMS**

STARTING/ COMPLETION DATE : 09/76 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 300000
TASK CODE=F623A-18 **EPA=68-02-2167 ** (CNTR.) PRIOR FY76 / \$ 410000

EPA OFFICER.: CA VOGEL
INVESTIGATOR.: AB CHERRY
MILESTONES...: 09/76 -CONTRACT SIGNING
01/78 -REPORT ON CONTROL ASSAY DEVELOPMENT
06/78 -APPLICABILITY OF COKE OVEN CONTROLS TO SYNTHETIC FUELS
09/79 -EVALUATION OF ALL APPLICABLE CONTROLS

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
ORDIS CODES...: REC-001435 SSIE-GMA 3102 1 EPA -68-02-2167 TASK-F623A-18
AP -623A DU -N105 LABT-EMI

ABSTRACT.....: CATALYTIC, INC. SHALL CONDUCT A PROGRAM THAT WILL RESULT IN THE DEVELOPMENT OF TECHNOLOGY FOR THE
CONTROL OF ENVIRONMENTAL POLLUTION FROM UTILIZATION OF THE PRODUCTS AND BY-PRODUCTS OF FUEL
CONVERSION/FUEL UTILIZATION SYSTEMS BASED ON COAL. THE OBJECTIVE OF THIS PROJECT IS TO ASSESS THE
DEGREE OF REMOVAL AND RECOVERY OR DESTRUCTION OF CONTAMINANTS THAT CAN OCCUR DURING PROCESSING FOR
UPGRADING THE PRODUCTS AND BY-PRODUCTS TO MAKE THEM SUITABLE FOR MARKETING. PRODUCTS OF FUEL
SYSTEMS ARE DEFINED TO ENCOMPASS THE PRIMARY MARKETABLE MATERIALS FROM FUEL SYSTEMS. BY-PRODUCTS OF
FUEL SYSTEMS ARE DEFINED TO ENCOMPASS ALL OTHER USEABLE OR POTENTIALLY USEABLE COMPONENTS OF A FUEL
SYSTEM OUTPUT SLATE. FUEL SYSTEM PRODUCTS OR BY-PRODUCTS WHICH EITHER (1) ARE TOTALLY CONSUMED
WITHIN THE BASIC PRODUCTION SYSTEM (AS FOR STEAM-RAISING) OR (2) ARE TOTALLY CONSUMED AS A
PETROCHEMICAL FEEDSTOCK SHALL NOT BE CONSIDERED FOR CONTROL TECHNOLOGY DEVELOPMENT.

****PROJECT: 01436-BENCH SCALE STUDY OF THE MEYERS PROCESS FOR COAL DESULFURIZATION**

STARTING/ COMPLETION DATE : 11/75 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 175421
TASK CODE=F623A-19 **EPA=68-02-2121 ** (CNTR.) PRIOR FY76 / \$ 321569

EPA OFFICER.: RD TAMNIG
INVESTIGATOR.: RA MEYERS
EP KOUTSOUKOS
JW HAMERSMA
R ORSINI
MJ SANTY
THOMPSON RAMO WOOLDRIDGE INC
THOMPSON RAMO WOOLDRIDGE INC
THOMPSON RAMO WOOLDRIDGE INC
THOMPSON RAMO WOOLDRIDGE INC
THOMPSON RAMO WOOLDRIDGE INC

MILESTONES...: 03/75 -COMPLETE LITERATURE SURVEY
07/75 -COMPLETE COAL PROCESSING CHARACTERIZATION
08/75 -COMPLETE CHEMICAL ANALYSES OF COAL SAMPLES
09/75 -COMPLETE PRODUCT RECOVERY ANALYSES
01/77 -COMPLETE COAL SAMPLE DEPYRITIZATION
05/77 -COMPLETE DATA ANALYSIS
07/77 -COMPLETE ENGINEERING ANALYSIS

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
ORDIS CODES...: REC-001436 SSIE-GMA 4190 EPA -68-02-2121 TASK-F623A-19
AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THE CONTRACTOR SHALL PROCESS DIFFERENT TYPES OF RAW COAL THROUGH A BENCH SCALE FACILITY FOR CHEMICAL
LEACHING OF PYRITIC SULFUR FROM COAL. THE CONTRACTOR SHALL COMPLETELY CHARACTERIZE THE RAW COAL
SAMPLES AND SHALL DETERMINE AT LEAST PROXIMATE AND ULTIMATE ANALYSES AND SULFUR FORMS ANALYSES. THE
CONTRACTOR SHALL ALSO EXAMINE THE RAW COAL SAMPLES FOR TRACE CONSTITUENTS. THE CONTRACTOR SHALL, AS
A MINIMUM, GATHER THE FOLLOWING DATA: 1. SULFUR REMOVAL BY CHEMICAL LEACHING AS A FUNCTION OF TIME.
2. CHARACTERIZATION OF THE PRODUCTS. 3. TRACE ELEMENT DISTRIBUTION IN THE PRODUCTS.

****PROJECT: 01437-REACTOR TEST PROJECT FOR CHEMICAL REMOVAL OF PYRITIC SULFUR FROM COAL**

STARTING/ COMPLETION DATE : 05/76 - 04/78 : FUNDING : ESTIMATED - FY77 / \$ 980700
TASK CODE=F623A-20 **EPA=68-02-1880 ** (CNTR.) PRIOR FY76 / \$ 1750000

EPA OFFICER.: RD TAMNIG
INVESTIGATOR.: RA MEYERS
LJ VANNICE
MJ SANTY
LP KOUTSOUKOS
WM BOWES
THOMPSON RAMO WOOLDRIDGE INC
THOMPSON RAMO WOOLDRIDGE INC
THOMPSON RAMO WOOLDRIDGE INC
THOMPSON RAMO WOOLDRIDGE INC
THOMPSON RAMO WOOLDRIDGE INC

MILESTONES...: 10/78 -INITIAL TEST OPERATION OF REACTOR TEST UNIT SCHEDULED
10/79 -LONG-TERM CONTINUOUS OPERATION (120 HR.) OF REACTOR TEST UNIT

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
ORDIS CODES...: REC-001437 SSIE-GMA 4189 EPA -68-02-1880 TASK-F623A-20
AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THE CONTRACTOR WILL CONSTRUCT A REACTOR TEST UNIT FOR EVALUATION OF THE PYRITE LEACHING FROM FINE
COAL. LEACH SOLUTION REGENERATION, AND INITIAL FILTRATION OPERATIONS OF THE MEYERS PROCESS FOR COAL
DESULFURIZATION. THE REACTOR TEST UNIT WILL BE CAPABLE OF CONTINUOUS OPERATION AT THE NOMINAL RATE
OF 250-750 POUNDS OF COAL PER HOUR. THE INPUT MATERIAL TO THE TEST REACTOR SYSTEM IS PROPERLY SIZED
COAL, EITHER CLEANED OR UNCLEARED; THE OUTPUT MATERIAL IS THE REACTED COAL WHICH HAS BEEN FILTERED
AND WASHED ON THE FILTER. THIS TEST UNIT WILL BE CONSTRUCTED IN ACCORDANCE WITH THE PREDESIGN
SPECIFICATIONS PREPARED UNDER CONTRACT 68-02-1335 FOR THE REACTOR TEST UNIT (OMITTING THE COARSE
COAL REACTOR SYSTEM). THE REACTOR TEST UNIT WILL BE ERECTED AT A SITE PROVIDED BY THE CONTR

****PROJECT: 01438-DEVELOPMENT PROGRAM FOR TREATMENT OF COAL TO PRODUCE LOW-SULFUR, SOLID FOSSIL FUEL**

STARTING/ COMPLETION DATE : 11/75 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 161046
 TASK CODE=F623A-21 **EPA=68-02-2126 ** (CNTR.) PRIOR FY76 / \$ 208000

EPA OFFICER.: RD TAMNIG EPA/IERL - RTP
 INVESTIGATOR.: DK FLEMING INST. OF GAS TECHNOLOGY
 RD SMITH INST. OF GAS TECHNOLOGY
 MR AQUINO INST. OF GAS TECHNOLOGY

MILESTONES....: 10/76 -COAL SAMPLE TEST BATCH REACTOR OPERATIONAL
 10/76 -COAL SAMPLE SELECTION FOR BATCH TEST FINALIZED
 10/76 -COAL SAMPLE THERMOBALANCE TEST UNIT OPERATIONAL
 07/77 -COAL SAMPLE BATCH REACTOR UNIT TESTS COMPLETED
 09/77 -ANALYSIS OF BATCH REACTOR UNIT TESTS COMPLETED
 08/77 -COAL SAMPLE REACTOR TEST RUNS GAS SAMPLE ANALYSIS INITIATED
 09/77 -PREPARED FOR INCLUSION IN FINAL REPORT

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: REC-001438 SSIE-GMA 2850 1 EPA -68-02-2126 TASK-F623A-21
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROGRAM IS TO DETERMINE ON A BENCH- AND PILOT-UNIT SCALE THE OPERATING PARAMETERS FOR THE IGT PROCESS TO DESULFURIZE COAL BY THERMAL AND CHEMICAL MEANS. COAL WILL BE TREATED WITH A REDUCING ATMOSPHERE IN THE PRESENCE OF A SULFUR GETTER. SULFUR REMOVAL WILL BE DETERMINED AS A FUNCTION OF TEMPERATURE, RESIDENCE TIME, COAL/GETTER RATIO, COAL COMPOSITION, AND PARTICLE SIZE. IN WORK TO DATE UNDER EARLIER CONTRACTS, MIDWESTERN COAL WITH 3.5-4% SULFUR CONTENT HAS BEEN CONVERTED INTO SOLID FOSSIL FUEL THAT CAN BE BURNED DIRECTLY IN CONFORMANCE WITH FEDERAL EPA NEW SOURCE PERFORMANCE STANDARDS FOR SULFUR EMISSION.

****PROJECT: 01439-COAL DESULFURIZATION BY MICROWAVE ENERGY**

STARTING/ COMPLETION DATE : 07/76 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 147068
 TASK CODE=F623A-22 **EPA=68-02-2172 ** (CNTR.) PRIOR FY76 / \$ 80000

EPA OFFICER.: LD TAMNIG EPA/IERL - RTP
 INVESTIGATOR.: PD ZAVITSANOS GENERAL ELECTRIC CO
 PD GORSUCH GENERAL ELECTRIC CO
 JA GOLDEN GENERAL ELECTRIC CO
 H THAL GENERAL ELECTRIC CO

MILESTONES....: 08/76 -SELECTION OF COAL SAMPLES WITH REACTION CHARACTERISTICS SUITABLE
 10/76 -EVALUATION OF THE EFFECTIVENESS OF VARIOUS MICROWAVE FREQUENCIES
 03/77 -EVALUATION OF SULFUR REACTION TO VARIOUS LENGTHS OF EXPOSURE
 06/77 -EVALUATION OF BENEFITS RECEIVED FROM COAL WASH WITH SODIUM H

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: REC-001439 SSIE-GMA 3030 1 EPA -68-02-2172 TASK-F623A-22
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROGRAM IS TO CONDUCT RESEARCH AND DEVELOPMENT WHICH WILL LEAD INTO A COST EFFECTIVE METHOD FOR REDUCING SULFUR OXIDE EMISSIONS (DURING COAL COMBUSTION) TO ENVIRONMENTALLY ACCEPTABLE LEVELS. THE APPROACH IS BASED ON THE USE OF MICROWAVE ENERGY WHICH CAN BE COUPLED PREFERENTIALLY INTO IRON PYRITES AND LEACHANTS AND INDUCE REACTIONS WHICH PRODUCE SULFUR COMPOUNDS WHICH CAN EITHER BE SEPARATED EASILY FROM COAL OR DO NOT CONVERT INTO SULFUR OXIDES DURING COMBUSTION. RESULTS TO DATE SHOW THAT IRON PYRITE (FES₂) AND NAOH DO INDEED COUPLE WITH MICROWAVE EFFICIENTLY AND REACT TO FORM WATER SOLUBLE SULFUR PRODUCTS. COAL ON THE OTHER HAND IS A LOW LOSS MATERIAL. THE PLAN IS TO INVESTIGATE THE MECHANISM OF ENERGY ABSORPTION AND IMPORTANT REACTIONS INVOLVING SULFUR REARRANGEMENT.

****PROJECT: 01440-PROGRAM SUPPORT IN FOSSIL FUEL PROCESSING AND SYNTHETIC FUELS**

STARTING/ COMPLETION DATE : 04/76 - 02/77 : FUNDING : ESTIMATED - FY77 / \$ 9400
 TASK CODE=F623A-23 **EPA=68-02-2152 ** (CNTR.) PRIOR FY76 / \$ 320600

EPA OFFICER.: LD TAMNY EPA/IERL - RTP
 INVESTIGATOR.: T BORER CAMERON ENGINEERS INC

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: REC-001440 SSIE-GMA 4406 EPA -68-02-2152 TASK-F623A-23
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: CAMERON ENGINEERS WILL PROVIDE TO EPA SYSTEMS ANALYSIS AND PROGRAM SUPPORT PRIMARILY IN THE AREAS OF COAL PROCESSING, COAL LIQUEFACTION, COAL GASIFICATION, AND SHALE OIL PROCESSING. INCLUDED IN THESE AREAS ARE THE ENVIRONMENTAL ASSESSMENT OF BOTH TECHNOLOGIES AND UTILIZATION OF PRODUCTS AND BYPRODUCTS AS WELL AS THE ENVIRONMENTAL ASSESSMENT OF ENVIRONMENTAL CONTROL TECHNOLOGY BYPRODUCTS. CAMERON ENGINEERS IS TO PROVIDE A VIEWPOINT INDEPENDENT FROM THAT OF EPA CONTRACTORS THAT ARE WORKING IN THE ENVIRONMENTAL ASSESSMENT, ENVIRONMENTAL CONTROL TECHNOLOGY DEVELOPMENT, AND PROCESS TECHNOLOGY DEVELOPMENT AREAS. CAMERON ENGINEERS' PRIMARY ROLE IS TO PROVIDE TECHNICAL INFORMATION TO THE EPA TECHNICAL PROJECT MANAGEMENT TEAM IN ITS DECISION MAKING ROLE. THIS WILL BE ACCOMPLISHED THROUGH BACKGROUND FUNCTIONS (SUCH AS LITERATURE SURVEYS AND REVIEWS OF TECHNICAL REPORTS), COORDINATION FUNCTIONS, COMMUNICATION FUNCTIONS AND PROGRAM PLANNING SUPPORT. THIS TECHNICAL ASSISTANCE WILL BE PROVIDED ON AS REQUESTED BASIS BY TASK ORDER.

****PROJECT: 01442-POLLUTANTS FROM SYNTHETIC FUELS PROCESSES**

STARTING/ COMPLETION DATE : 11/76 - 10/81 : FUNDING : ESTIMATED - FY77 / \$ 829856
 TASK CODE=F623A-24 **EPA=R804979-02 ** (GRANT) PRIOR FY76 / \$ 300000

EPA OFFICER.: TW PETRIE
 INVESTIGATOR.: FO MIXON
 J CLELAND
 D WAGONER
 D ROSENTHAL
 R ZWEIDINGER
 C SPARICINO

EPA/IERL - RTP
 RESEARCH TRIANGLE INST
 RESEARCH TRIANGLE INST
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 RESEARCH TRIANGLE INST

MILESTONES....: 07/77 -REACTOR FACILITY AND ANALYSIS EQUIPMENT OPERATIONAL
 12/77 -TEST PLAN FORMULATED
 12/78 -KINETICS OF POLLUTANT FORMATION SCREENED
 10/79 -KINETICS OF POLLUTANT FORMATION MEASURED THOROUGHLY
 11/80 -ENVIRONMENTAL ASSESSMENT COMPLETED
 07/81 -RECOMMENDATIONS FOR CONTROL STRATEGIES MADE

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001442 SSIE-GMA 2318 2 EPA -R804979-02 TASK-F623A-24
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THE PURPOSE OF THE RESEARCH IS TO DEVELOP A FUNDAMENTAL UNDERSTANDING OF THOSE FACTORS AND CONDITIONS WHICH CAUSE THE PRODUCTION OF ENVIRONMENTAL POLLUTANTS IN SYNFUELS PROCESSES AND TO PROVIDE TO EPA AND TO THE SCIENTIFIC AND TECHNICAL COMMUNITY THE INFORMATION NEEDED TO GUIDE THE CONTROL OF POTENTIALLY HAZARDOUS MATERIALS FROM SYNFUELS PLANTS OF THE FUTURE. THE RESEARCH PLAN INCLUDES BOTH AN EXPERIMENTAL AND AN ANALYTICAL STUDY. THE EXPERIMENTAL STUDY INCLUDES FIRST THE DESIGN, FABRICATION AND OPERATION OF ONE OR MORE LABORATORY REACTORS TO SIMULATE CONDITIONS WHICH MAY BE UTILIZED IN ACTUAL SYNFUELS PLANTS. THE DEVELOPMENT AND IMPLEMENTATION OF CHEMICAL ANALYSIS PROCEDURES FOR THE EVALUATION OF ELEMENTS AND COMPOUNDS THAT RESULT, FOR SCREENING OF THE MAJOR COALS WHICH ARE AVAILABLE IN THE U.S., AND FOR THE DETERMINATION OF THE KINETICS OF FORMATION OF THE POLLUTANTS OF SIGNIFICANCE. THE ANALYTICAL STUDY PROVIDES FOR UTILIZING RESULTS OF THE SCREENING TESTS TO (1) PROJECT POTENTIAL HUMAN EXPOSURE TO EFFLUENTS AND EMISSIONS FROM THESE PLANTS AND (2) ESTABLISH PRIORITY RATINGS FOR THE VARIOUS POLLUTANTS BASED UPON THE EXTENT TO WHICH PROJECTED EXPOSURES ARE HAZARDOUS.

****PROJECT: 01443-IN SITU FINE PARTICULATE MEASUREMENT**

STARTING/ COMPLETION DATE : 10/77 - 04/79 : FUNDING : ESTIMATED - FY77 / \$ 162259
 TASK CODE=F623A-25 **EPA=68-02-2668 ** (CNTR.) PRIOR FY /

EPA OFFICER.: WB KUYKENDAL
 INVESTIGATOR.: UNKNOWN
 MILESTONES....: 02/78 -COMPLETION OF DESIGN STUDY
 10/78 -COMPLETION OF LABORATORY DEVELOPMENT
 04/79 -COMPLETION OF FIELD EVALUATION

EPA/IERL - RTP
 PARTICLE MEASURING SYSS

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001443 SSIE-GMA 4685 EPA -68-02-2668 TASK-F623A-25
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: OBJECTIVE: THIS PROJECT WILL DESIGN, DEVELOP, AND DEMONSTRATE AN IN SITU INSTRUMENT FOR REAL-TIME PARTICLE SIZING IN STATIONARY SOURCES. APPROACH: THREE APPROACHES WILL BE PURSUED TO DEVELOP A REAL-TIME INSTRUMENT: (1) A PURELY OPTICAL PARTICLE-SIZING INSTRUMENT, (2) AN ACOUSTIC APPROACH TO SIZING PARTICLES, AND (3) AN IMPACTOR BASED INSTRUMENT WITH AN OPTICAL READOUT. OUTPUT: PROTOTYPE INSTRUMENT AND RESEARCH REPORTS.

****PROJECT: 01445-MEASUREMENT OF HIGH TEMPERATURE, HIGH PRESSURE PROCESSES**

STARTING/ COMPLETION DATE : 03/76 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 85000
 TASK CODE=F623A-26 **EPA=68-02-2153 ** (CNTR.) PRIOR FY76 / \$ 578000

EPA OFFICER.: WB KUYKENDAL
 INVESTIGATOR.: F MORENO
 C HARTMAN
 DR BLANN
 J STEINER

EPA/IERL - RTP
 ACUREX CORP
 ACUREX CORP
 ACUREX CORP
 ACUREX CORP

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MILESTONES....: 05/77 -DEMONSTRATION OF PROBE SYSTEM FOR FLUIDIZED BED COMBUSTION
 02/78 -DESIGN OF PROBE SYSTEM FOR COAL GASIFICATION

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001445 SSIE-GMA 2347 2 EPA -68-02-2153 TASK-F623A-26
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: OBJECTIVE: THE OBJECTIVE IS TO DEVELOP MEASUREMENT TECHNIQUES TO GENERATE ENGINEERING DATA FOR ENVIRONMENTAL ASSESSMENT AND CONTROL TECHNOLOGY DEVELOPMENT PROJECTS EVALUATING HIGHER TEMPERATURE, HIGH PRESSURE PROCESSES. THE TWO PROCESSES OF INITIAL INTEREST ARE HIGH PRESSURE FLUIDIZED BED COMBUSTION AND COAL GASIFICATION. EPA IN-HOUSE RESEARCH PROJECTS WILL BE SUPPORTED THROUGH REVIEW OF PROGRAM PLANS AND TEST PLANS IN THE AREA OF HIGH TEMPERATURE, HIGH PRESSURE PROCESSES AND DESIGN AND CONSTRUCTION OF AN EPA IN-HOUSE SAMPLING TEST RIG. APPROACH: THE PROGRAM WILL FIRST ESTABLISH A BASELINE TECHNOLOGY EFFORT TO PROVIDE THE RESOURCES FOR CONTINUAL PROBLEM SOLVING. THIS BASELINE PROGRAM WILL BE SUPPLEMENTED WITH SPECIFIC ASSIGNMENTS BY THE EPA PROJECT OFFICER. THE TECHNICAL LEVEL OF EFFORT WILL BE MAINTAINED RELATIVELY CONSTANT. OUTPUT: A PROBING SYSTEM HAS BEEN DESIGNED, FABRICATED, AND DEMONSTRATED ON A PRESSURIZED FLUIDIZED BED COMBUSTOR. THE SYSTEM MEASURES PARTICLE SIZE AND MASS AS WELL AS PROVIDES A GAS SAMPLE.

****PROJECT: 01448-STUDIES RELATED TO THE ORGANIC CHEMICAL ANALYSIS OF INDUSTRIAL SAMPLES**

STARTING/ COMPLETION DATE : 09/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 28000
 TASK CODE=F623A-28 **EPA-R805494-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: LD JOHNSON EPA/IERL - RTP
 INVESTIGATOR.: CH LOCHMULLER DUKE UNIV
 MILESTONES....: 09/77 -GRANT STARTS
 11/79 -FINAL REPORT
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001448 SSIE-GMA 4170 EPA -R805494-01 TASK-F623A-28
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: OBJECTIVE: THE OBJECTIVE OF THESE STUDIES IS TO PROVIDE A FIRMER UNDERSTANDING OF THE BEHAVIOR OF POROUS POLYMER SORBENTS IN SOURCE SAMPLING EFFORTS. APPROACH: PREVIOUS WORK HAS DEALT WITH THE EFFECTS OF REACTION WITH ACIDS AND ACID GASES ON THE SORPTION CAPACITY AND SELECTIVITY OF THESE MATERIALS. RESULTS TO DATE INDICATE THAT SULFONATION AND NITRATION CAN INDEED AFFECT BOTH THE AMOUNT AND THE RELATIVE DISTRIBUTION OF REPRESENTATIVE ORGANIC COMPOUNDS ON THESE SORBENTS. THIS EFFECT WILL BE ESPECIALLY SIGNIFICANT IF THE SAMPLING EFFORT IS CARRIED OUT PAST "BREAKTHROUGH"; THAT IS, IF THE SORBENT TRAP CAPACITY IS EXCEEDED BY THE CHALLENGE CONCENTRATION. POROUS POLYMER SORBENTS HAVE BEEN USED TO SAMPLE AMBIENT AIR AND SOURCES AT TEMPERATURES IN WHICH THE PRINCIPAL SORPTION MECHANISM IS GAS-SOLID ADSORPTION. MORE RECENTLY, THESE SORBENTS HAVE BEEN USED IN SOURCE SAMPLING AT TEMPERATURES WHICH CAUSE THE CONDENSATION OF SIGNIFICANT AMOUNTS OF WATER. THIS REDUCES THE PROBABILITY OF ACID-POLYMER MECHANISM. IN THE WORK PROPOSED BOTH DYNAMIC (LIQUID CHROMATOGRAPHY) AND STATIC METHODS WILL BE EXAMINED AS METHODS FOR THE LABORATORY MEASUREMENT OF SORPTION CAPACITY AND SELECTIVITY AS A FUNCTION OF PH AND TEMPERATURE. IN ADDITION, THE RELATION BETWEEN WATER-BENZENE DISTRIBUTION AND WATER-STYRENE POLYMER (XAD-2) ADSORPTION WILL BE EXAMINED. INFORMATION OBTAINED FROM LITERATURE VALUES FOR BENZENE-WATER-SOLUTE SYSTEMS AND LABORATORY-MEASURED POLYMER STUDIES WILL BE USED TO ATTEMPT TO DEVELOP A PREDICTIVE MODEL FOR SAMPLING PURPOSES. OUTPUT: FINAL REPORT TO BE ENTERED INTO ORD SYSTEM. OF DIRECT USE TO IERL BUT ALSO OF INTEREST TO SCIENTIFIC COMMUNITY.

****PROJECT: 01449-DEVELOPMENT OF HIGH-TEMPERATURE/HIGH-PRESSURE ELECTROSTATIC PRECIPITATOR**

STARTING/ COMPLETION DATE : 06/75 - 10/77 : FUNDING : ESTIMATED - FY77 / \$ 49826
 TASK CODE=F623A-29 **EPA-68-02-2104 ** (CNTR.) PRIOR FY74 / \$ 137612
 EPA OFFICER.: LE SPARKS EPA/IERL - RTP
 INVESTIGATOR.: P FELDMAN COTTRELL ENV SYSS
 MILESTONES....: 06/75 -AWARD CONTRACT
 10/77 -ISSUE FINAL REPORT CONTAINING DATA NEEDED TO DESIGN HIGH TEMPERAT U
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001449 SSIE-GMA 4405 EPA -68-02-2104 TASK-F623A-29
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THE OBJECTIVES ARE TO DETERMINE THE FEASIBILITY OF USING ELECTROSTATIC PRECIPITATORS FOR PARTICULATE COLLECTION AT HIGH TEMPERATURES AND PRESSURES AND TO DEVELOP BASIC DATA ON ELECTRICAL CONDITIONS AT HIGH TEMPERATURES/PRESSURES TO ENABLE ONE TO DESIGN HIGH-TEMPERATURE/PRESSURE ELECTROSTATIC PRECIPITATOR. DATA WILL BE OBTAINED BY CONDUCTING EXPERIMENTS IN SMALL SCALE WIRE-PIPE ELECTROSTATIC PRECIPITATOR UNDER NO-FLOW CONDITIONS. END ITEMS AND USERS: REPORT ON ELECTRICAL CHARACTERISTICS TO BE EXPECTED IN HIGH-TEMPERATURE/PRESSURE ELECTROSTATIC PRECIPITATORS. USERS INCLUDE ALL ORGANIZATIONS (ERC/EPA/ETC.) AND INDIVIDUALS INTERESTED IN PARTICULATE COLLECTION AT HIGH TEMPERATURES/PRESSURES.

****PROJECT: 01450-REVIEW OF CONTROL TECHNOLOGIES FOR OPEN SOURCES OF PARTICULATE EMISSIONS**

STARTING/ COMPLETION DATE : 07/77 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 40000
 TASK CODE=F623A-30 **EPA-R805294-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: DC DREHMEI EPA/IERL - RTP
 INVESTIGATOR.: DW COOPER HARVARD UNIV PUBLIC HEALTH/PHYS DEPT
 DW MOELLER HARVARD UNIV PUBLIC HEALTH/PHYS DEPT
 MILESTONES....: 07/77 -AWARD GRANT
 07/78 -COMPLETE RANKING OF CONTROL TECHNOLOGY
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001450 SSIE-GMA 4140 EPA -R805294-01 TASK-F623A-30
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: OBJECTIVE: TO ASSESS CONTROL TECHNOLOGY FOR OPEN SOURCES. APPROACH: THIS WORK WILL IDENTIFY, DESCRIBE, AND ANALYZE EXISTING METHODS FOR THE CONTROL OF OPEN SOURCES OF PARTICULATE EMISSIONS. FROM THE ANALYSIS OF THE STATE OF THE ART AND OF THE AREAS OF NEED, THE INVESTIGATORS WILL DETERMINE PRIORITIES FOR RESEARCH, DEVELOPMENT, AND APPLICATION IN THE CONTROL OF OPEN SOURCE EMISSIONS. OUTPUT: REVIEW AND RANKING OF OPEN SOURCE CONTROL PROCEDURES AND DEVICES.

****PROJECT: 01453-THE EFFECTS OF HIGH TEMPERATURE AND PRESSURE ON PARTICLE COLLECTION MECHANISMS**

STARTING/ COMPLETION DATE : 12/75 - 04/78 : FUNDING : ESTIMATED - FY77 / \$ 10000
 TASK CODE=F623A-31 **EPA-68-02-2137 ** (CNTR.) PRIOR FY76 / \$ 350000
 EPA OFFICER.: DC DREHMEL EPA/IERL - RTP
 INVESTIGATOR.: S CALVERT AIR POLLUTION TECH INC
 R PARKER AIR POLLUTION TECH INC

MILESTONES....: 12/75 -CONTRACT AWARD
 01/77 -COMPLETE THEORETICAL REVIEW
 09/77 -COMPLETE STUDY OF COLLECTION REQUIREMENT FOR VARIOUS APPLICATION
 04/78 -COMPLETE BENCH SCALE VERIFICATION THEORY

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001453 SSIE-GMA 3011 1 EPA -68-02-2137 TASK-F623A-31
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: OBJECTIVE: TO CONDUCT A THEORETICAL AND EXPERIMENTAL INVESTIGATION TO DETERMINE THE EFFECTS OF HIGH TEMPERATURE (1,100 DEGREES C), HIGH PRESSURE (15 ATM), AND PARTICLE DIAMETER ON PARTICULATE COLLECTION MECHANISMS, AND TO IDENTIFY MECHANISMS THAT MIGHT BE USED TO REMOVE PARTICLES FROM HIGH-TEMPERATURE AND/OR HIGH-PRESSURE GAS STREAMS. EXISTING AND PROPOSED ENERGY PROCESSES REQUIRING HIGH-TEMPERATURE AND/OR HIGH-PRESSURE PARTICULATE CLEANUP WILL ALSO BE STUDIED TO DETERMINE THE IMPORTANT CHARACTERISTICS, CLEANUP REQUIREMENTS, AND POTENTIAL PROBLEMS OF EACH PROCESS. APPROACH: THE INVESTIGATION WILL INCLUDE A THOROUGH LITERATURE SEARCH, SURVEY, AND EVALUATION OF THE PRESENT STATE OF KNOWLEDGE CONCERNING HIGH-TEMPERATURE AND -PRESSURE AEROSOL MECHANISMS AND COLLECTION MECHANISMS. LABORATORY-SCALE EXPERIMENTS WILL BE CONDUCTED TO OBTAIN NECESSARY DATA ON THE BEHAVIOR OF AEROSOLS IN HIGH TEMPERATURE AND PRESSURE ENVIRONMENTS, AND THE RESULTS WILL BE USED TO IMPROVE PRESENT THEORY, TO IDENTIFY USEFUL HIGH TEMPERATURE AND HIGH PRESSURE COLLECTION MECHANISMS FOR PARTICULATE REMOVAL, AND TO RECOMMEND PROGRAMS FOR THE DEVELOPMENT AND DEMONSTRATION OF PARTICULATE CONTROL DEVICES BASED UPON THESE MECHANISMS. OUTPUTS: REVIEW OF THEORY AND BENCH SCALE VERIFICATION

****PROJECT: 01457-NEW CONCEPT FOR FINE PARTICLE CONTROL AT HIGH TEMPERATURE AND PRESSURE**

STARTING/ COMPLETION DATE : 08/76 - 08/78 : FUNDING : ESTIMATED - FY77 / \$ 330000
 TASK CODE=F623A-32 **EPA-68-02-2164 ** (CNTR.) PRIOR FY76 / \$ 100000
 EPA OFFICER.: DC DREHMEL EPA/IERL - RTP
 INVESTIGATOR.: S CALVERT AIR POLLUTION TECH INC
 RG PATTERSON AIR POLLUTION TECH INC

MILESTONES....: 08/76 -CONTRACT AWARD
 08/77 -COMPLETE STUDY OF COMPONENTS OF NEW DEVICE
 08/78 -COMPLETE FEASIBILITY TESTS OF INTEGRATED SYSTEM

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001457 SSIE-GMA 3024 1 EPA -68-02-2164 TASK-F623A-32
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: OBJECTIVE: THE DEVELOPMENT OF ADVANCED ENERGY SOURCES SUCH AS COAL AND SHALE OIL GASIFICATION RESULTS IN HIGH TEMPERATURE AND PRESSURE PROCESS GAS STREAMS WHICH REQUIRE REMOVAL OF PARTICULATES BEFORE UTILIZATION. THE OBJECTIVE OF THIS RESEARCH IS TO EVALUATE A NOVEL CONCEPT FOR FINE PARTICLE CONTROL IN THESE SYSTEMS. THE APPARATUS WOULD COLLECT FINE PARTICLES BY MECHANISMS SUCH AS DIFFUSION, INERTIAL IMPACTION, INTERCEPTION AND ELECTROPHORESIS. APPROACH: A PRELIMINARY EVALUATION OF THE NEW CONCEPT WILL BE PERFORMED, FOLLOWED BY EXPERIMENTAL VERIFICATION OF FINE PARTICLE COLLECTION. PRESENTLY THEORETICAL CALCULATIONS ARE BEING PERFORMED FOR MECHANISMS INVOLVED IN PARTICLE COLLECTION AND SYSTEM REGENERATION. THE POWER AND RESIDENCE TIME REQUIREMENTS FOR PARTICLE CAPTURE WILL BE PREDICTED FOR THE MOST PROMISING MECHANISMS. BASED ON THESE CALCULATIONS, PRELIMINARY BENCH-SCALE EXPERIMENTS WILL BE PERFORMED TO DEMONSTRATE THE FEASIBILITY OF FINE PARTICLE CAPTURE IN THE PROPOSED PARTICLE COLLECTION SYSTEM. THIS WILL BE FOLLOWED BY THE ECONOMIC ANALYSIS AND RECOMMENDATIONS. THE SECOND PHASE OF THE PROJECT WILL CONSIST OF THE CONSTRUCTION AND TESTING OF A MODEL OF THE NEW CONCEPT WITH AT LEAST 500 SCFM CAPACITY. OUTPUTS: PROVE FEASIBILITY OF DRY SCRUBBER CONCEPT FOR CONTROL OF PARTICULATE AT HIGH TEMPERATURE AND PRESSURE. THIS CONCEPT WILL BEAR ON THE ECONOMIC SUCCESS OF THE ADVANCED ENERGY PROCESSES.

****PROJECT: 01458-FINE PARTICLE CONTROL BY HOT FILTRATION**

STARTING/ COMPLETION DATE : 08/76 - 08/78 : FUNDING : ESTIMATED - FY77 / \$ 400000
 TASK CODE=F623A-33 **EPA-68-02-2169 ** (CNTR.) PRIOR FY76 / \$ 200000
 EPA OFFICER.: DC DREHMEL EPA/IERL - RTP
 INVESTIGATOR.: FE MORENO ACUREX CORP
 C HARTMAN ACUREX CORP AEROTHERM DIV
 AEROTHERM DIV

MILESTONES....: 08/76 -CONTRACT AWARD
 12/77 -COMPLETE MATRIX OF BENCH SCALE TESTS ON CANDIDATE FILTRATION
 08/78 -COMPLETE LIFE TESTING OF BEST MATERIALS

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001458 SSIE-GMA 3098 1 EPA -68-02-2169 TASK-F623A-33
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: OBJECTIVE: TO DEMONSTRATE THE TECHNICAL AND ECONOMIC VIABILITY OF FABRIC FILTRATION AS A MEANS OF FINE PARTICLE CONTROL AT HIGH TEMPERATURES (1,500 DEGREES F) AND PRESSURES (10 ATM). APPROACH: PHASE I CONSISTS OF A MATRIX OF BENCH-SCALE TESTS DESIGNED TO DEMONSTRATE THE BASIC FEASIBILITY OF CANDIDATE MATERIALS AND REGENERATION MECHANISMS. THESE MATERIALS WILL BE DEVELOPED BY A COMBINATION OF IN-HOUSE EXPERTISE AND SUBCONTRACTED WORK TO A FABRIC WEAVER. THE PROGRAM WILL INCLUDE THE DEVELOPMENT OF A HIGH-TEMPERATURE/PRESSURE FILTRATION THEORY; A THOROUGH SEARCH FOR VIABLE MATERIALS TO SUPPLEMENT THOSE ALREADY IDENTIFIED; AND THE DESIGN, FABRICATION AND USE OF A BENCH-SCALE TESTING APPARATUS. WITH THE IDENTIFICATION OF THE MOST PROMISING MATERIALS SYSTEMS AN ECONOMIC ANALYSIS WILL BE PERFORMED AND RECOMMENDATIONS MADE FOR THE CONTINUATION OF THE DEVELOPMENT PROGRAM, I.E., PHASE II. PHASE II OF THE PROPOSED PROGRAM WILL CONTINUE THE DEVELOPMENT OF THE PROMISING CONCEPTS IDENTIFIED IN PHASE I. A PILOT SCALE (500 SCFM) FACILITY WILL BE CONSTRUCTED AT AEROTHERM TO DEMONSTRATE THE RELIABILITY OF THESE CONCEPTS. OUTPUTS: PHASE I WAS INITIATED 8/76 AND WILL REQUIRE 16 MONTHS FOR COMPLETION. PHASE II IS ANTICIPATED TO BE AN 8-MONTH EFFORT.

****PROJECT: 01481-THE USE OF ELECTROSTATICALLY CHARGED FOG FOR CONTROL OF DUST FROM OPEN SOURCES**

STARTING/ COMPLETION DATE : 06/77 - 06/79 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=F623A-34 **EPA-R805228 ** (GRANT) PRIOR FY /
 EPA OFFICER.: DC DREHMEI EPA/IERL - RTP
 INVESTIGATOR.: SA HOENIG UNIV OF ARIZONA SCH OF ENG
 MILESTONES....: 06/77 -GRANT AWARD

06/78 -COMPLETE LABORATORY STUDY OF CONTROLLING PARAMETERS
 06/79 -COMPLETE FIELD TESTS

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001461 SSIE-GMA 4137 EPA -R805228 TASK-F623A-34
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: OBJECTIVE: TO CONTINUE THE STUDIES OF INDUSTRIAL DUSTS AND FUMES AND THE DEVELOPMENT OF APPARATUS FOR INDUCING THESE POLLUTANTS TO AGGLOMERATE AND FALLOUT. ALSO TO INVESTIGATE THE PHENOMENA INVOLVED IN DUST/FUME CHARGING WITH THE HOPE OF PROVIDING BETTER DUST CONTROL SYSTEMS. APPROACH: THE STUDIES WILL BE PRIMARILY EXPERIMENTAL AND WILL GENERATE THE APPROPRIATE DUSTS AND FUMES UNDER CONTROLLED CONDITIONS TO DETERMINE THE PARAMETERS INVOLVED IN CHARGING PHENOMENA. UNIVERSITY OF ARIZONA WILL MAKE APPROPRIATE INDUSTRIAL MEASUREMENTS AND STUDIES TO EVALUATE CHARGING AND DUST CONTROL TECHNIQUES IN THE FACTORY ENVIRONMENT. CURRENT STATUS: UNIVERSITY OF ARIZONA HAS INVESTIGATED THE CHARGING BEHAVIOR OF A VARIETY OF DUSTS AND FUMES. MOST MATERIALS SEEM TO HAVE NEGATIVE CHARGES, AT LEAST FOR THE RESPIRABLE MATERIAL, BUT THERE ARE SOME NOTABLE EXCEPTIONS, I.E., MAGNETITE. IT HAS BEEN DEMONSTRATED THAT THESE DUSTS AND FUMES CAN BE INDUCED TO AGGLOMERATE AND FALLOUT WHEN EXPOSED TO PROPERLY CHARGED WATER FOG. A NUMBER OF INDUSTRIAL TESTS ARE UNDERWAY TO TEST PROTOTYPE FOG GENERATORS AS MECHANISMS FOR DUST CONTROL. UNIVERSITY OF ARIZONA HAS DONE SOME PRELIMINARY WORK ON CONTROL OF POWER PLANT FLY ASH AND COAL TAR VOLATILES (FROM COKE OVENS). HERE AGAIN IT APPEARS THAT THE CHARGED FOG SYSTEM HAS SIGNIFICANT POTENTIAL AS A CONTROL TECHNIQUE.

****PROJECT: 01483-PHOTOCHEMICAL STUDY OF NOX REMOVAL FROM STACK GASES**

STARTING/ COMPLETION DATE : 11/76 - 12/78 : FUNDING : ESTIMATED - FY77 / \$ 38551
 TASK CODE=F623A-35 **EPA-R804740-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: JA MCSORLEY EPA/IERL - RTP
 INVESTIGATOR.: DL FOX UNIV OF NORTH CAROLINA SCH OF PUBLIC HLTH
 MILESTONES....: 11/76 -GRANT AWARD

12/78 -RESEARCH COMPLETE
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001463 SSIE-GMA 3539 EPA -R804740-01 TASK-F623A-35
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THE PROPOSED RESEARCH IS TO EVALUATE THE FEASIBILITY OF NOX REMOVAL FROM FLUE GASES BY PHOTOCHEMICAL CONVERSION OF NO TO NO2 FOLLOWED BY AQUEOUS SCRUBBING. THE PROPOSED RESEARCH HAS THE POTENTIAL FOR REMOVAL OF FINE PARTICULATES AND SOX AS WELL AS NOX. THERE IS A GOOD PROBABILITY THAT THE FINE PARTICULATE WITH THE HIGH HUMIDITY OF A STACK GAS WILL ACT AS NUCLEATION SITES FOR NITRIC AND SULFURIC ACID MIST FORMATION. THE FORMATION OF AEROSOLS WOULD BE ENHANCED BY ANY PHOTOCHEMICALLY ACTIVE HYDROCARBONS THAT MAY BE IN THE FLUE GAS.

****PROJECT: 01484-NONPERSONAL, QUICK REACTION ENGINEERING AND TECHNICAL SERVICES**

STARTING/ COMPLETION DATE : 02/77 - 02/79 : FUNDING : ESTIMATED - FY77 / \$ 671853
 TASK CODE=F623A-37 **EPA-68-02-2612 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: JA MCSORLEY EPA/IERL - RTP
 INVESTIGATOR.: FO MIXON RESEARCH TRIANGLE INST
 MILESTONES....: 03/77 -CONTRACT AWARD

03/79 -ESTIMATED CONTRACT COMPLETION DATE
 PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001464 SSIE-GMA 3617 EPA -68-02-2612 TASK-F623A-37
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THE ENVIRONMENTAL PROTECTION AGENCY'S INDUSTRIAL ENVIRONMENTAL RESEARCH LABORATORY HAS THE MISSION TO SUPPORT AND ENCOURAGE THE DEVELOPMENT OF TECHNOLOGY FOR THE CONTROL OF AIR POLLUTION FROM ALL SOURCES. THE ACTIVITIES OF THE LABORATORY RANGE FROM THE IDENTIFICATION OF EMISSIONS SOURCES AND QUANTIFICATION OF THE EMISSIONS THEREFROM, THROUGH THE DEVELOPMENT OF CONTROL TECHNOLOGY FROM CONCEPTUAL IDEAS TO FULL-SCALE IMPLEMENTATION, TO THE EVALUATION OF THE ECONOMIC AND ENVIRONMENTAL IMPACT OF APPLICATIONS TO THE TECHNOLOGY. THIS PROJECT IS FOR SUPPORT OF THE TECHNICAL ACTIVITIES OF THE LABORATORY IN THE FOLLOWING AREAS: (1) ASSESSMENT OF ENVIRONMENTAL AND ECONOMIC IMPACT OF POLLUTION CONTROL SYSTEMS AS THEY BECOME COMMERCIALY AVAILABLE TO USER INDUSTRIES; (2) PROCESS ANALYSIS; (3) COST ESTIMATION OF POLLUTION CONTROL SYSTEMS THAT ARE BEING DEVELOPED BY EPA; (4) PROCESS RESEARCH; (5) EVALUATION OF THE ENERGY CONSERVATION POTENTIAL OF NEW POLLUTION CONTROL TECHNOLOGIES; (6) ENGINEERING ANALYSIS; (7) ASSESSMENT OF R&D PROGRAMS IN COAL LIQUEFACTION, LOW, MEDIUM, AND HIGH BTU GASIFICATION, ADVANCED COMBINATION RESEARCH, AND IMPROVED COAL EXTRACTION AND RECLAMATION TECHNIQUES; (8) PROCESS EMISSIONS AND CONTROL TECHNOLOGY SURVEYS; (9) IDENTIFICATION OF NEW ENVIRONMENTALLY ACCEPTABLE POWER SYSTEMS THAT CAN PROVIDE CLEANER, MORE EFFICIENT UTILIZATION OF FOSSIL FUELS; (10) ASSOCIATED TECHNICAL SERVICES; AND (11) REGIONAL ASSISTANCE AND STATE IMPLEMENTATION PLANNING.

****PROJECT: 01468-METHODOLOGIES FOR UTILIZATION OF ENVIRONMENTAL-IMPACT-ASSESSMENT DATA**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 59529
 TASK CODE=F623A-38 **EPA=R805476-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: CT RIPBERGER EPA/IERL - RTP
 INVESTIGATOR.: LR BABCOCK UNIV OF ILLINOIS MED CTR/ENV HLTH SCI
 RA WADDEN UNIV OF ILLINOIS MED CTR/ENV HLTH SCI

MILESTONES....: 10/78 -COMPLETE RESEARCH RELATED TO HEALTH EFFECT LINKAGES
 10/79 -COMPLETE RESEARCH RELATED TO TRANSPORT-TRANSFORMATION
 10/80 -COMPLETE INTEGRATION STUDIES

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001468 SSIE-GMA 4132 EPA -R805476-01 TASK-F623A-38
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THE PROPOSED RESEARCH SEEKS TO DEFINE METHODOLOGICAL APPROACHES FOR USE WITHIN EPA WHICH WOULD FACILITATE THE IDENTIFICATION OF HAZARDS AND SETTING OF STANDARDS AND CONTROL PRIORITIES. A NEW COMPREHENSIVE TYPE OF ASSESSMENT DATA IS BEING GENERATED WITHIN EPA, AND THE PROPOSED RESEARCH, IN PART, WOULD ATTEMPT TO DEFINE HOW SUCH INFORMATION MIGHT BE BEST UTILIZED BY HEALTH-EFFECTS, ATMOSPHERIC-CHEMISTRY AND OTHER INVOLVED GROUPS IN ORDER TO GENERATE MEANINGFUL CAUSE-EFFECT RESULTS IN THE SHORTEST TIME. THE RESEARCH WILL INCLUDE DEFINITION OF PERTINENT EPA UNITS AND PROCEDURES AND OBSTACLES TO INTERCHANGE OF RESEARCH RESULTS. METHODS FOR IMPROVING KNOWLEDGE TRANSFER WILL BE PROPOSED. COMPREHENSIVE ALTERNATIVES TO "SINGLE-POLLUTANT" METHODS WILL BE DEVELOPED. SEVERAL APPROACHES WILL BE CONSIDERED INCLUDING, BUT NOT LIMITED TO, THOSE BASED ON PREVIOUSLY-DEVELOPED AIR QUALITY INDEXES, PRIORITIZATION METHODOLOGIES, AND ASSESSMENTS OF HYPERSENSITIVE POPULATIONS. THE FIRST YEAR WILL EMPHASIZE LINKAGES BETWEEN THE INDUSTRIAL ENVIRONMENTAL RESEARCH LABORATORY AND HEALTH EFFECTS AND STANDARDS-SETTING UNITS OF EPA. THE SECOND YEAR WOULD EMPHASIZE LINKAGES WITH TRANSPORT-AND-TRANSFORMATION RESEARCH. THE THIRD YEAR WOULD EMPHASIZE INTEGRATION OF DIVERSE ASPECTS OF THE ENVIRONMENTAL MANAGEMENT SYSTEM.

****PROJECT: 01469-ENVIRONMENTAL STUDIES OF COAL CLEANING PROCESSES**

STARTING/ COMPLETION DATE : 09/77 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=F623A-90 **EPA=D8-E721-GA ** (IAG) PRIOR FY /

EPA OFFICER.: JD KILGROE EPA/IERL - RTP
 INVESTIGATOR.: RM COLE US TVA
 RJ RUANE US TVA
 HG MOORE US TVA

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001469 SSIE-GMA 4697 EPA -D8-E721-GA TASK-F623A-90
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: DEVELOP A PLAN AND PRELIMINARY COST ESTIMATES FOR A PROGRAM TO EVALUATE METHODS TO MINIMIZE ENVIRONMENTAL PROBLEMS FROM COAL CLEANING PLANT RESIDUALS, INCLUDING METHODS TO MINIMIZE REFUSE BY INCREASED COAL BTU RECOVERY AND SULFUR REMOVAL. TASK 1 WILL INVOLVE ENVIRONMENTAL EVALUATIONS OF THE CLEANING CIRCUITS FOR BRECKENRIDGE, PARADISE, AND POSSIBLY OTHERS, AND DEVELOPMENT OF RECOMMENDATIONS FOR BENCH-, PILOT-, AND FULL-, SCALE STUDIES.

****PROJECT: 01471-ASSESSMENT AND CONTROL OF WASTEWATER CONTAMINANTS ORIGINATING FROM THE PRODUCTION OF SYNTHETIC FUELS FROM COAL**

STARTING/ COMPLETION DATE : 11/76 - 10/81 : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=F623A-91 **EPA=R804917-02 ** (GRANT) PRIOR FY /

EPA OFFICER.: TW PETRIC EPA/IERL - RTP
 INVESTIGATOR.: PC SINGER UNIVERSITY OF NORTH CAROLINA
 JC LAMB UNIVERSITY OF NORTH CAROLINA
 RF CHRISTMAN UNIVERSITY OF NORTH CAROLINA
 FK PFAENDER UNIVERSITY OF NORTH CAROLINA

MILESTONES....: 11/76 -PROJECT INITIATION
 10/81 -PROJECT TERMINATION

PLAN ID.....: (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES...: RECN-001471 SSIE-GMA 4821 EPA -R804917-02 TASK-F623A-91
 AP -623A DU -N105 LABT-EMI

ABSTRACT.....: THIS IS ONE OF A MULTI-PART PROJECT WHOSE SUMMARY MAY BE IDENTICAL TO OTHERS. THE PURPOSE OF THIS PROJECT IS TO ASSESS THE ENVIRONMENTAL IMPACT OF WASTEWATER CONTAMINANTS ORIGINATING FROM THE PRODUCTION OF SYNTHETIC FUELS FROM COAL, AND TO EVALUATE ALTERNATIVE WASTEWATER TREATMENT TECHNOLOGIES FOR THE CONTROL OF THESE CONTAMINANTS. THE PROJECT IS CARRIED OUT IN SEVERAL PHASES OVER A 5-YEAR PERIOD CONSISTING OF (A) A LITERATURE REVIEW AND SURVEY OF PILOT- AND FULL-SCALE COAL CONVERSION FACILITIES TO IDENTIFY SPECIFIC CONTAMINANTS WHICH MIGHT BE FOUND IN COAL PROCESSING WASTEWATERS, (B) A STUDY OF THE BIODEGRADABILITY OF SELECTED ORGANIC CONSTITUENTS FROM SUCH WASTEWATERS INCLUDING AN ASSESSMENT OF THE AQUATIC IMPACT OF THESE CONSTITUENTS AND BIODEGRADATION PRODUCTS, (C) BIOLOGICAL AND PHYSICAL-CHEMICAL TREATABILITY STUDIES OF SELECTED ORGANIC CONSTITUENTS AND IDENTIFICATION OF THE RESIDUALS FOLLOWING TREATMENT, (D) ANIMAL TOXICOLOGY STUDIES TO EVALUATE THE POTENTIAL HEALTH EFFECTS OF THOSE WASTEWATER COMPONENTS FOR WHICH SUFFICIENT INFORMATION IS NOT AVAILABLE IN THE LITERATURE, (E) TREATABILITY STUDIES OF COMPOSITE SYNTHETIC AND REAL COAL-PROCESSING WATERS INCLUDING ANALYTICAL CHARACTERIZATION AND AQUATIC IMPACT ASSESSMENT OF THE TREATED WATERS, AND (F) DEVELOPMENT OF DESIGN CRITERIA TREATMENT OF WASTEWATERS FROM COAL-CONVERSION FACILITIES.

****PROJECT: 03997-REDUCE ADVERSE ENVIRONMENTAL EFFECTS FROM URANIUM MILL WASTES**

STARTING/ COMPLETION DATE : 07/75 - 10/80 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=V623A-05 **EPA=D6-E681-FP ** (IAG) PRIOR FY /

EPA OFFICER.: C HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: FF HAYWOOD U.S. DEPT. OF ENERGY
 WA GOLDSMITH U.S. DEPT. OF ENERGY
 RW LEGGETT U.S. DEPT. OF ENERGY

PLAN ID..... (AP-623A)(DU-N105) FUEL PROCESSING
 ORDIS CODES... REC-N-003997 SSIE-GMA 5364 EPA -D6-E681-FP TASK-V623A-05
 AP -623A DU -N105 LABT-EMI

ABSTRACT..... THIS PROJECT WAS ORGANIZED TO CHARACTERIZE THE CURRENT RADIOLOGICAL CONDITION OF 23 INACTIVE URANIUM MILLS IN THE WESTERN UNITED STATES. AT EACH SITE, A SERIES OF MEASUREMENTS WERE MADE TO ESTABLISH THE BOUNDARIES OF AREAS CONTAMINATED WITH TAILING MATERIAL WHICH HAD BEEN BLOWN OR WASHED FROM THE ORIGINAL TAILINGS PILE. HOLES WERE BORED THROUGH TAILING PILES AND GAMMA RAY MEASUREMENTS WERE MADE AS A FUNCTION OF DEPTH IN ORDER TO DETERMINE THE DEPTH OF RADIONUCLIDE MIGRATION BENEATH THE TAILINGS. IN ORDER TO QUANTIFY THE OFF-SITE MIGRATION OF TAILINGS RADIONUCLIDES, ENVIRONMENTAL SAMPLES (SOIL, WATER, SEDIMENT, AND VEGETATION) WERE COLLECTED AND ANALYZED FOR 226RA, 238U, 230TH, AND 210PB. CONCENTRATIONS OF RADON AND PROGENY WERE DETERMINED IN SOME EXISTING MILL STRUCTURES AND IN SOME STRUCTURES WHERE TAILINGS MATERIAL HAD BEEN USED AS CONSTRUCTION MATERIAL. REPORTS OF THE FINDINGS OF THE RADIOLOGICAL SURVEY AT EACH MILL SITE ARE BEING PREPARED AND WILL BE ISSUED BY SEPTEMBER

****PROJECT: 01472-FIELD TESTING - APPLICATION OF COMBUSTION MODIFICATION TECHNIQUES TO CONTROL POLLUTANT EMISSIONS FROM INDUSTRIAL BOILERS**

STARTING/ COMPLETION DATE : 06/73 - 08/77 : FUNDING : ESTIMATED - FY77 / \$ 29260
 TASK CODE=F624A-001 **EPA=68-02-1074 ** (CNTR.) PRIOR FY76 / \$ 834910

EPA OFFICER.: RE HALL EPA/IERL - RTP
 INVESTIGATOR.: RE THOMPSON K V B ENG INC
 SC HUNTER K V B ENG INC

MILESTONES...: 06/73 -CONTRACT START DATE
 10/73 -SUBMIT BOILER SURVEY
 07/74 -PHASE I - 50 SHORT TERM BOILER FIELD TESTS COMPLETED
 09/74 -PHASE I - FINAL REPORT COMPLETED
 10/74 -PHASE II - WORK PLAN SUBMITTED
 08/75 -PHASE II - 20 LONG TERM BOILER FIELD TESTS COMPLETED
 03/76 -PHASE II - FINAL REPORT COMPLETED
 12/76 -INDUSTRIAL BOILER OPERATOR GUIDELINE COMPLETED
 06/77 -PHASES I & II DATA SUPPLEMENT COMPLETED
 08/77 -INDUSTRIAL BOILER DESIGN GUIDELINE COMPLETED

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... REC-N-001472 SSIE-GMA 4193 EPA -68-02-1074 TASK-F624A-001
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... THE PURPOSE OF THIS WORK IS TO DETERMINE THE EFFECTIVENESS OF KNOWN COMBUSTION MODIFICATION TECHNIQUES TO CONTROL POLLUTANT EMISSIONS FROM INDUSTRIAL BOILERS. IN ADDITION, THE EFFORT WILL ESTABLISH WHAT THE BOILER MANUFACTURERS AND USERS CAN DO TO CONTROL EMISSIONS WITH EXISTING STATE-OF-THE-ART TECHNOLOGY AND WHERE COMBUSTION RESEARCH ACTIVITIES SHOULD BE CONCENTRATED. AN EXPERIMENTAL FIELD TEST PROGRAM WAS CARRIED OUT TO INVESTIGATE THE EFFECTS OF OPERATING VARIABLES AND COMBUSTION MODIFICATION (E.G., EXCESS AIR LEVEL, LOAD, FLUE GAS RECIRCULATION, STAGED COMBUSTION, FUEL TEMPERATURE AND BURNER DESIGN) ON AIR POLLUTANT EMISSIONS FROM INDUSTRIAL BOILERS OF VARIOUS DESIGN FIRED WITH COAL, OIL, GAS AND MIXED FUELS. THE POLLUTANTS OF INTEREST IN THIS STUDY WERE OXIDES OF NITROGEN, OXIDES OF SULFUR, HYDROCARBONS, CARBON MONOXIDE, SMOKE, COMBUSTIBLE AND NON-COMBUSTIBLE PARTICULATE AND TRACE ELEMENTS. FINAL REPORTS PROVIDING THE DATA AND CONCLUSIONS FROM THE TESTING OF MORE THAN SIXTY INDUSTRIAL BOILERS UNDER A VARIETY OF CONDITIONS HAVE BEEN ISSUED. AT PRESENT, AN INDUSTRIAL BOILER OPERATOR'S MANUAL AND A MANUFACTURER'S MANUAL ARE BEING PREPARED AND ARE EXPECTED TO BE COMPLETED IN THE FIRST HALF OF 1977.

****PROJECT: 01478-DEVELOPMENT OF CRITERIA FOR EXTENSION OF APPLICABILITY OF LOW-EMISSION, HIGH-EFFICIENCY COAL BURNERS IN PROGRESS**

STARTING/ COMPLETION DATE : 10/77 - 10/80 : FUNDING : ESTIMATED - FY77 / \$ 950000
 TASK CODE=F624A-005 **EPA=68-02-2667 ** (CNTR.) PRIOR FY /

EPA OFFICER.: GB MARTIN EPA/IERL - RTP
 INVESTIGATOR.: UNKNOWN ENERGY & ENVIRON. RES. CORP

MILESTONES...: 10/77 -INITIATE CONTRACT
 10/79 -CRITERIA FOR EASTERN AND WESTERN COALS
 10/80 -CRITERIA FOR PHYSICAL/CHEMICAL CLEANED COALS

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... REC-N-001476 SSIE-GMA 4691 EPA -68-02-2667 TASK-F624A-005
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THIS STUDY IS TO EXTEND THE APPLICABILITY OF ADVANCED PULVERIZED COAL BURNER CONCEPTS TO THE FULL RANGE OF U.S. COALS AND TO A VARIETY OF BOILER FIRING CONFIGURATIONS. THE APPROACH UTILIZES SEVERAL SCALES OF COMBUSTION SYSTEMS TO DERIVE SCALE-UP CRITERIA FOR BURNERS OF PRACTICAL SIZE. THE EFFECTS OF FUEL CHARACTERISTICS AND BURNER DESIGN PARAMETERS ARE STUDIED IN A SYSTEMATIC FASHION FOR A WIDE RANGE OF COAL TYPES. IN-FLAME PROBING IS USED TO EXTEND THE UNDERSTANDING OF CRITICAL PROCESSES IN COAL COMBUSTION. BURNER CONCEPTS THAT SHOW PROMISE ARE TESTED ON A PRACTICAL SCALE (120 TIMES 10 TO THE 6TH POWER BTU/HR.).

****PROJECT: 01488-ORGANIZATION OF CLEAN COAL COMBUSTION CONFERENCE**

STARTING/ COMPLETION DATE : 04/77 - 10/77 : FUNDING : ESTIMATED - FY77 / \$ 9975
 TASK CODE=F624A-015 **EPA** ** (CNTR.) PRIOR FY /

EPA OFFICER.: GB MARTIN EPA/IERL - RTP
 INVESTIGATOR.: VS ENGLEMAN SCI APPLICATIONS INC

MILESTONES...: 04/77 -INITIATE CONTRACT
 08/77 -HOLD MEETING
 10/77 -PROCEEDINGS ISSUED

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION AP -624A
 ORDIS CODES...: RECN-001488 SSIE-GMA 4409 TASK-F624A-015
 DU -L110 LABT-EMI

ABSTRACT.....: THE PURPOSE OF THIS PROJECT WAS TO ORGANIZE A CONFERENCE COVERING ALL ASPECTS OF ENVIRONMENTALLY
 ACCEPTABLE AND ENERGY-EFFICIENT TECHNOLOGY FOR DIRECT UTILIZATION OF COAL. THE FIVE-DAY MEETING WAS
 STRUCTURED TO COVER: 1) ENERGY AND ENVIRONMENTAL POLICY; 2) PRE-COMBUSTION FUEL CLEANING; 3)
 COMBUSTION TECHNOLOGY; 4) POST-COMBUSTION FLUE GAS CLEANING TECHNOLOGY; 5) TRENDS AND FUTURE
 DIRECTIONS. THE CONFERENCE WAS HELD FROM AUGUST 1 TO 5, 1977 AS A PART OF THE ENGINEERING
 FOUNDATION CONFERENCE SERIES AND A PROCEEDINGS IS IN PREPARATION.

Fuel Extraction

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****PROJECT: 00330-FUGITIVE DUST FROM OIL SHALE EXTRACTION**

STARTING/ COMPLETION DATE : 07/77 - 04/78 : FUNDING : ESTIMATED - FY77 / \$ 63000
 TASK CODE=B623B-T52 **EPA=68-03-2560 ** (CNTR.) PRIOR FY76 / \$
 EPA OFFICER.: ER BATES
 INVESTIGATOR.: I ZUCKERMAN
 MILESTONES...: 07/77 -FUNDING PACKAGE SUBMITTED
 07/77 -AWARD FUNDS FOR PROJECT
 08/77 -INITIATE SAMPLE COLLECTION
 10/77 -COMPLETE SAMPLE COLLECTION
 11/77 -COMPLETE ANALYSES
 01/78 -DRAFT FINAL REPORT
 04/78 -COMPLETE FINAL REPORT
 PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-N-000330 SSIE-GMA 3687 EPA -68-03-2560 TASK-B623B-T52
 AP -623B DU -N105 LABT-EMI
 ABSTRACT.....: OBJECTIVE: TO CONDUCT A SURVEY OF THE QUANTITY OF FUGITIVE DUST PRODUCED BY OIL SHALE EXTRACTION AT THE ANVIL POINTS, COLORADO FACILITY. TO DETERMINE SOME OF THE MAJOR INORGANIC COMPONENTS OF THE DUST. APPROACH: HIGH VOLUME SAMPLES WILL BE USED TO COLLECT FUGITIVE DUST AT THE MINE, ALONG THE HAUL ROAD, NEAR THE CRUSHER, AND NEAR THE SPENT SHALE DISPOSAL AREA. MASS SOURCE SPECTROMETRY WILL BE USED FOR ELEMENTAL ANALYSIS. PARTICLE SIZE DISTRIBUTION WILL BE DETERMINED BY CASCADE IMPACTORS. PROGRESS: STUDY IS TO COMMENCE IN SEPTEMBER, 1977.

****PROJECT: 00332-REMOVAL OF TOXIC MATERIAL FROM MINE DRAINAGE**

STARTING/ COMPLETION DATE : 08/77 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=B623B-T71 **EPA=68-03-2568 ** (CNTR.) PRIOR FY76 / \$
 EPA OFFICER.: RC WILMOTH
 INVESTIGATOR.: MA ZEITOUN
 MILESTONES...: 08/77 -FUNDING PACKAGE SUBMITTED
 08/77 -AWARD FUNDS FOR PROJECT
 08/77 -BEGIN ON SITE INVESTIGATION
 10/77 -COMPLETE ON SITE WORK
 01/78 -DRAFT FINAL REPORT
 01/78 -EXECUTIVE SUMMARY
 02/78 -REVISE REPORT
 03/78 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-N-000332 SSIE-GMA 4387 EPA -68-03-2568 TASK-B623B-T71
 AP -623B DU -N105 LABT-EMI
 ABSTRACT.....: THE OBJECTIVE OF THE PROJECT IS TO STUDY REMOVAL OF TOXIC MATERIALS FROM ACID MINE DRAINAGE BY THREE PROCESSES: REVERSE OSMOSIS, ION EXCHANGE, AND LIME NEUTRALIZATION. THE ANTICIPATED APPROACH IS TO INJECT SPECIFIED TOXIC MATERIALS FROM A BULK SOLUTION INTO AN AND PROCESS STREAM AT THE EPA CROWN FIELD SITE NEAR MORGANTOWN, WEST VIRGINIA. THE TOXIC MATERIALS TO BE USED FOR THE STUDY ARE: ARSENIC, BORON, CADMIUM, CHROMIUM, COPPER, LEAD, MERCURY, NICKEL, PHOSPHORUS, SELENIUM, AND ZINC.

****PROJECT: 00334-EFFECTIVENESS OF SURFACE MINE SEDIMENTATION PONDS**

STARTING/ COMPLETION DATE : 10/74 - 11/77 : FUNDING : ESTIMATED - FY77 / \$ 2000
 TASK CODE=B623B-319 **EPA=68-03-2139 ** (CNTR.) PRIOR FY76 / \$ 99000
 EPA OFFICER.: RD HILL
 INVESTIGATOR.: B BECKER
 MILESTONES...: 07/74 -FUNDING PACKAGE SUBMITTED
 10/74 -AWARD FUNDS FOR PROJECT
 03/77 -FUNDING INCREMENT
 11/77 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-N-000334 SSIE-GMA 3685 EPA -68-03-2139 TASK-B623B-319
 AP -623B DU -N105 LABT-EMI
 ABSTRACT.....: AN IN-FIELD EVALUATION OF THE EFFECTIVENESS OF SEDIMENT PONDS IN REDUCING SUSPENDED SOLIDS IN THE RUNOFF FROM SURFACE MINING ACTIVITIES WAS PERFORMED. NINE SELECTED SEDIMENTATION PONDS IN THE THREE EASTERN COAL-MINING STATES OF PENNSYLVANIA, WEST VIRGINIA, AND KENTUCKY WERE SAMPLED UNDER TWO DIFFERENT OPERATING CONDITIONS--A BASE LINE AND A RAINFALL EVENT. THEIR THEORETICAL AND ACTUAL EFFICIENCY OF REMOVAL OF SUSPENDED SOLIDS WERE COMPUTED AND COMPARED. IN GENERAL, POOR CONSTRUCTION AND INADEQUATE MAINTENANCE OF THESE PONDS WERE FOUND TO BE THE MAJOR PROBLEM AREAS. THE PONDS HAD GENERALLY HIGHER REMOVAL EFFICIENCIES DURING THE BASELINE SAMPLING PERIOD AND MUCH LOWER EFFICIENCIES DURING THE STORM EVENT. THE THEORETICALLY PREDICTED EFFICIENCY OF THE PONDS WAS ESSENTIALLY THE SAME AS THE ACTUAL EFFICIENCY UNDER BASE LINE CONDITIONS. DURING THE RAINFALL EVENT, THERE WAS GENERALLY LITTLE OR NO CORRELATION BETWEEN THE THEORETICAL AND ACTUAL EFFICIENCIES. THE PREDICTED EFFICIENCIES WERE FOUND TO BE MUCH HIGHER THAN THE ACTUAL EFFICIENCIES DURING THE RAINFALL EVENT IN MOST CASES.

****PROJECT: 00335-COAL AND THE ENVIRONMENT - ABSTRACT BIBLIOGRAPHIES**

STARTING/ COMPLETION DATE : 05/77 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 000
 TASK CODE=B623B-320 **EPA-R805336-01 ** (GRANT) PRIOR FY76 / \$
 EPA OFFICER.: RD HILL EPA/IERL - CINC
 INVESTIGATOR.: JF BOYER BITUMINOUS COAL RES INC
 VE GLEASON BITUMINOUS COAL RES INC
 MILESTONES.... 05/77 -FUNDING PACKAGE SUBMITTED
 06/77 -AWARD FUNDS FOR PROJECT
 10/78 -FINAL REPORT RECEIVED
 PLAN ID..... (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES... REC-N-000335 SSIE-GMA 3730 EPA -R805336-01 TASK-B623B-320
 AP -623B DU -N105 LABT-EMI

ABSTRACT..... THE OBJECTIVE IS TO PROVIDE EASY ACCESSIBILITY TO THE SPECIFIC LITERATURE ON THE ENVIRONMENTAL PROBLEMS RELATED TO COAL PRODUCTION. THE PROBLEMS COVERED ARE COAL MINE DRAINAGE, DISPOSAL OF THE REFUSE MATERIAL GENERATED BY COAL MINES AND COAL CLEANING PLANTS, AND SURFACE MINE RECLAMATION. THIS OBJECTIVE WILL BE ATTAINED BY COLLECTING ALL RELEVANT INFORMATION AND PREPARING, ON AN ANNUAL ROTATING BASIS, ABSTRACT BIBLIOGRAPHIES OF THE LITERATURE FOR EACH SUBJECT AREA. THE REFUSE BIBLIOGRAPHY WILL BE AVAILABLE EARLY IN 1978 AND THE RECLAMATION BIBLIOGRAPHY EARLY IN 1979. EACH BIBLIOGRAPHY WILL CONTAIN A LISTING OF REFERENCES TO THE MINE DRAINAGE BIBLIOGRAPHY PUBLISHED IN 1976. THIS PROJECT IS A CONTINUATION OF WORK BEGUN AT BCR IN 1961. CURRENTLY THE HOLDINGS IN THE BCR LIBRARY ON COAL MINE DRAINAGE ARE THE LARGEST IN THE WORLD. FROM 1964 TO 1975 BCR PREPARED, FOR PUBLICATION BY THE COMMONWEALTH OF PENNSYLVANIA, AN ANNUAL BIBLIOGRAPHY OF ABSTRACTS ON MINE DRAINAGE. IN 1976 EPA AND THE COMMONWEALTH SPONSORED THE PREPARATION BY BCR OF A COMPREHENSIVE MINE DRAINAGE BIBLIOGRAPHY. IN 1975 BCR AND THE NATIONAL COAL ASSOCIATION PUBLISHED A BIBLIOGRAPHY ON COAL MINED-LAND RECLAMATION. COLLECTING OF MATERIAL ON REFUSE DISPOSAL BEGAN IN 1974; NO ABSTRACT BIBLIOGRAPHY HAS BEEN PREPARED.

****PROJECT: 00338-POLLUTION CONTROL GUIDELINES FOR COAL REFUSE PILES AND SLURRY PONDS**

STARTING/ COMPLETION DATE : 12/75 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 5000
 TASK CODE=B623B-325 **EPA-68-03-2344 ** (CNTR.) PRIOR FY76 / \$ 134000
 EPA OFFICER.: E BATES EPA/IERL - CINC
 INVESTIGATOR.: JP CONNELL W.A. WAHLER & ASSOCIATES
 JV VANTINE W.A. WAHLER & ASSOCIATES
 MILESTONES.... 03/75 -FUNDING PACKAGE SUBMITTED
 12/75 -AWARD FUNDS FOR PROJECT
 06/77 -FUNDING INCREMENT
 09/77 -FINAL REPORT RECEIVED
 PLAN ID..... (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES... REC-N-000338 SSIE-GMA 3133 1 EPA -68-03-2344 TASK-B623B-325
 AP -623B DU -N105 LABT-EMI

ABSTRACT..... OBJECTIVE: DEVELOP GUIDELINES FOR CONSTRUCTION OF COAL REFUSE PILES AND SLURRY PONDS WITH EMPHASIS ON ENVIRONMENTAL PROTECTION OF BOTH AIR AND WATER WHILE MAINTAINING STRUCTURAL STABILITY OF THE MATERIAL. APPROACH: REVIEW CURRENT LITERATURE AND INTERVIEW KEY GOVERNMENT AND INDUSTRIAL PERSONNEL FOR INFORMATION ON PROPER DESIGN OF REFUSE DISPOSAL FACILITIES. EVALUATE IN THE FIELD, COAL REFUSE DISPOSAL SITES AND SLURRY POND INSTALLATIONS. THE STUDY SITES WILL BE IN THE EASTERN U.S. AND WILL BE IN BOTH FLAT AND MORE RUGGED TERRAIN. ANY WATER EMANATING FROM THE DISPOSAL SITES WILL BE SAMPLED FOUR TIMES, TWICE EACH IN THE WET AND DRY SEASONS. VARIOUS PHYSICAL AND WATER QUALITY DETERMINATIONS WILL BE MADE ON EACH SAMPLE SERIES. A SET OF CONSTRUCTION GUIDELINES WILL BE DEVELOPED WHICH WILL ADDRESS HAULAGE, COMPACTION, LAYERING, SOIL COVERING, PREPARATION PLANT PROCEDURES, RECLAMATION PLANNING, AND STRUCTURAL MATERIAL STABILITY. THE GUIDELINES WILL BE BASED IN PART ON THE FIELD STUDIES AND THE LITERATURE SEARCH, AND WILL CONFORM TO CURRENT MESA REQUIREMENTS. CURRENT PLANS: LITERATURE SEARCH IS UNDERWAY; INITIAL SITES ARE BEING SELECTED FOR INCLUSION ON THE CANDIDATE SITE LIST. PLANS ARE BEING MADE FOR AN AERIAL SURVEY OF THE CANDIDATE SITE LIST BEFORE GROUND VISITS ARE MADE TO A REDUCED LIST. FROM THESE SURVEYS, THE ACTUAL LIST OF STUDY SITES WILL BE SELECTED. FIELD WORK, SAMPLING, AND WATER TESTING WILL COMMENCE IN MARCH, 1976.

****PROJECT: 00339-EVALUATION OF GROUNDWATER POLLUTION FROM EASTERN UNDERGROUND COAL MINES**

STARTING/ COMPLETION DATE : 10/76 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 74000
 TASK CODE=B623B-331 **EPA-68-03-2467 ** (CNTR.) PRIOR FY76 / \$ 130000
 EPA OFFICER.: E BATES EPA/IERL - CINC
 INVESTIGATOR.: WH WALKER GERAGHTY & MILLER INC
 DC BRAIDS GERAGHTY & MILLER INC
 LW SAPERSTEIN GERAGHTY & MILLER INC
 MILESTONES.... 02/76 -FUNDING PACKAGE SUBMITTED
 09/76 -AWARD FUNDS FOR PROJECT
 02/77 -FUNDING INCREMENT
 07/78 -FINAL REPORT RECEIVED
 PLAN ID..... (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES... REC-N-000339 SSIE-GMA 3200 1 EPA -68-03-2467 TASK-B623B-331
 AP -623B DU -N105 LABT-EMI

ABSTRACT..... UNDERGROUND COAL MINES WILL DISRUPT THE EXISTING HYDROLOGIC SYSTEM AND HAVE THE POTENTIAL TO POLLUTE THE GROUNDWATER IN THE VICINITY OF THE MINING OPERATION. THE RATE, DIRECTION OF MOVEMENT, AND DILUTION OF THE GROUNDWATER POLLUTED BY UNDERGROUND MINING OPERATIONS NEEDS TO BE STUDIED. THE COLLECTION AND ANALYSIS OF AVAILABLE INFORMATION FROM THE LITERATURE, STATE AND FEDERAL AGENCIES AND INDUSTRY CONCERNING PROBLEMS RELATED TO GROUNDWATER POLLUTION FROM EASTERN UNDERGROUND COAL MINES SHOULD BE ASSIMILATED. SELECTION OF NINE MINE SITES WHERE A DETAILED EVALUATION OF GROUNDWATER POLLUTION PROBLEMS CAN BE MADE. DETERMINE NECESSARY CORRECTIVE ACTION NEEDED OR BEING USED AND THE IMPROVEMENT IN GROUNDWATER QUALITY THAT RESULTS FROM THE CORRECTIVE ACTION.

****PROJECT: 003 1-DEMONSTRATION OF CONNECTOR WELLS**

STARTING/ COMPLETION DATE : 06/74 - 11/79 : FUNDING : ESTIMATED - FY77 / \$ 40000
 TASK CODE=B623B-342 **EPA=S803191-01 ** (GRANT) PRIOR FY76 / \$ 52000

EPA OFFICER SJ HUBBARD EPA/IERL - CINC
 INVESTIGATOR J DEMCHALK STATE DEPT OF ENV RES
 RR PARIZEK PENNSYLVANIA STATE UNIV
 VM BEARD STATE DEPT OF ENV RES

MILESTONES... 05/74 -FUNDING PACKAGE SUBMITTED
 06/74 -AWARD FUNDS FOR PROJECT
 05/77 -AMENDMENT TO GRANT
 11/79 -FINAL REPORT RECEIVED

PLAN ID..... (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES... REC-N-000341 SSIE-GMA 3740 EPA -S803191-01 TASK-B623B-342
 AP -623B DU -N105 LABT-EMI

ABSTRACT.... OBJECTIVE: TO STUDY THE FEASIBILITY AND EFFECTIVENESS OF USING GRAVITY CONNECTOR WELLS TO IMPROVE STREAM QUALITY BY REDUCING DRAINAGE FROM ABANDONED DEEP COAL MINES. APPROACH: SELECT THE BEST SITE FOR DEMONSTRATING THE EFFECTIVENESS OF GRAVITY CONNECTOR WELLS FOR REDUCING DRAINAGE FROM ABANDONED DEEP COAL MINES. DETERMINE OPTIMUM NUMBER AND LOCATION OF GRAVITY DRAINAGE WELLS AND ESTIMATE THE QUANTITY OF DRAINAGE THAT WILL BE ABATED. CURRENT PLANS: CURRENT PLANS ARE FOR CONDUCTING A FEASIBILITY STUDY OF AN OPTIMUM DEMONSTRATION SITE AND DEVELOP PLANS AND SPECIFICATIONS FOR A FULL-SCALE FIELD DEMONSTRATION OF THE TECHNIQUE. THE SITE WILL BE STUDIED TO DETERMINE ITS HYDROGEOLOGIC AND MINING CONDITIONS AFFECTING GRAVITY DRAINAGE OF RELATED AQUIFERS THAT WILL SIGNIFICANTLY REDUCE DEEP MINE DRAINAGE. THE STUDY WILL CAPITALIZE ON AVAILABLE DATA, BUT ALSO INCLUDE LIMITED DRILLING AND TESTING TO DETERMINE AQUIFER FLOW CHARACTERISTICS. FOLLOWING EVALUATION OF THE DEMONSTRATION SITE, CONTINUOUS MONITORING OF QUALITY AND QUANTITY OF DEEP MINE DISCHARGE WILL COMMENCE. DETAILED DESIGN PLANS FOR THE GRAVITY DRAINAGE WELLS WILL BE DETERMINED BASED ON THE HYDROGEOLOGY AND AQUIFER FLOW CHARACTERISTICS OF THE SITE. THE OPTIMUM LOCATION OF THE WELLS WILL BE DETERMINED BY STUDYING FRACTURE TRACE PATTERNS AS RELATED TO AQUIFER FLOW CHARACTERISTICS AND HYDROGEOLOGY. BASED ON THE ABOVE, A DETERMINATION WILL BE MADE OF THE NUMBER AND LOCATIONS FOR CONSTRUCTING THE REQUIRED GRAVITY DRAINAGE WELLS. AS MANY AS FOUR CONNECTOR WELLS WILL BE CONSTRUCTED TO STUDY THE MINE DRAINAGE REDUCTION POSSIBLE FROM THIS TECHNIQUE.

****PROJECT: 0034 1-EFFECTS OF SURFACE CONFIGURATION IN WATER POLLUTION CONTROL ON SEMI-ARID MINED LANDS**

STARTING/ COMPLETION DATE : 09/77 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 200000
 TASK CODE=B623B-353 **EPA=R803079-04 ** (GRANT) PRIOR FY76 / \$ 1047000

EPA OFFICER JF MARTIN EPA/IERL - CINC
 INVESTIGATOR RL HODDER MONTANA STATE UNIV
 IB JENSEN MONTANA STATE UNIV
 D DOLLHOPF MONTANA STATE UNIV
 D HALK MONTANA STATE UNIV
 J OLSON MONTANA STATE UNIV
 W VANVOAST STATE BUREAU OF MINES & GEOLOGY

MILESTONES... 00/74 -FUNDING PACKAGE SUBMITTED
 00/74 -AWARD FUNDS
 11/78 -FINAL REPORT RECEIVED

PLAN ID..... (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES... REC-N-000344 SSIE-GMA 3647 2 EPA -R803079-04 TASK-B623B-353
 AP -623B DU -N105 LABT-EMI

ABSTRACT.... OBJECTIVES OF THIS STUDY ARE TO DEMONSTRATE THE EFFECTIVENESS OF SEVERAL SURFACE CONFIGURATIONS IN: CONTROLLING EROSION, RUNOFF, SEDIMENTATION AND POLLUTION OF ADJACENT DRAINAGES; QUICKLY PRODUCING A DESIRABLE STABILIZING VEGETATIVE COVER; CREATING AN EQUILIBRIUM BETWEEN PRECIPITATION ABSORBED AND SOIL MOISTURE EVAPORATED AND TRANSPIRED SO THAT GROUND WATER POLLUTION WILL REMAIN MINIMAL; PRODUCING AN OVERALL DESIRABLE RECLAMATION DESIGN PROVIDING EFFECTIVE DRAINAGE, ESTHETICS, PRODUCTIVENESS AND USE. DEMONSTRATION AREAS APPROXIMATELY 16 HECTARES IN SIZE WERE LOCATED ON RESHAPED SPOILS OF STRIP MINED COAL MINES NEAR COLSTRIP, MT; SAVAGE, MT; BEULAH, ND; HANNA, WY; AND GLENROCK, WY. FIVE TREATMENTS EVALUATED INCLUDE DEEP CHISELING IN TOPSOIL, DEEP CHISELING NO TOPSOIL, GOUGING IN TOPSOIL, GOUGING NO TOPSOIL AND DOZER BASINS IN TOPSOIL. FIVE 0.21 HECTARE MICROWATERSHEDS HAVE BEEN CONSTRUCTED AT EACH AREA TO AID IN INTENSIVELY EVALUATING EACH TREATMENT. TREATMENT EVALUATION AT EACH AREA INCLUDE: METEOROLOGICAL MONITORING, SURFACE RUNOFF WATER QUALITY, SOIL MOISTURE, EVAPOTRANSPIRATION RATE, WATER AQUIFER LEVELS. IMPLEMENTATION OF THE FIVE AREAS HAS BEEN COMPLETED AND DATA IS BEING COLLECTED AND PROCESSED. THE FIRST REPORT WILL BE PUBLISHED DURING 1977. TREATMENT EVALUATIONS ARE SCHEDULED THROUGH SEPTEMBER 12, 1978.

****PROJECT: 00345-POTENTIAL IMPACTS TO GROUND-WATER & SURFACE-WATER QUALITY & QUANTITY
FROM PROPOSED ENERGY DEVELOPMENT ON THE NORTHERN CHEYENNE RE**

STARTING/ COMPLETION DATE : 06/75 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 177000
TASK CODE=B623B-356 **EPA-R803566-03 ** (GRANT) PRIOR FY76 / \$ 477000
EPA OFFICER.: JF MARTIN EPA/IERL - CINC
INVESTIGATOR.: R MONTEAU NORTHERN CHEYENNE TRIBE
WW WOESSNER NORTHERN CHEYENNE TRIBE
E HEFFERN NORTHERN CHEYENNE TRIBE

MILESTONES....: 05/75 -FUNDING PACKAGE SUBMITTED
06/75 -AWARD FUNDS FOR PROJECT
04/76 -FUNDING INCREMENT
03/77 -FUNDING INCREMENT
09/78 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
ORDIS CODES...: RECN-000345 SSIE-GMA 2726 1 EPA -R803566-03 TASK-B623B-356
AP -623B DU -N105 LABT-EMI

ABSTRACT.....: THE NORTHERN CHEYENNE TRIBE, VIA THE NORTHERN CHEYENNE RESEARCH PROJECT, DESIRES TO DEVELOP AN IN-DEPTH KNOWLEDGE OF THE CHEMICAL AND PHYSICAL CHARACTER OF THE RESERVATION WATER RESOURCES, AND THE INTERRELATION OF WATER TO OTHER RESOURCES, SO THAT THE TRIBE CAN MAKE FORMAL CHOICES IN PLANNING COAL DEVELOPMENT. A THREE-YEAR STUDY PLAN HAS BEGUN TO: (1) GATHER AND INTERPRET BASELINE DATA CONCERNING THE WATER RESOURCES AND THE INTERRELATIONSHIPS OF THESE DATA TO LAND, BIOCOMMUNITY, SUPPLY NEEDS, AND ENERGY RESOURCES OF THE RESERVATION; (2) ASCERTAIN POTENTIAL ADVERSE CHEMICAL, PHYSICAL, AND ECONOMIC IMPACTS TO RESERVATION WATER RESOURCES FROM COAL DEVELOPMENT; AND (3) DEVELOP A COMPREHENSIVE WATER RESOURCES MANAGEMENT PLAN THAT WILL AID PRESENT AND FUTURE PLANNING FOR RESOURCES EXPLOITATION. STANDARD FIELD AND LABORATORY METHODOLOGY ARE BEING EMPLOYED IN ASSESSING THE GEOLOGY, SURFACE WATER, AND GROUND WATER OF RESERVATION LANDS. BASELINE DISCHARGE AND WATER QUALITY DATA COLLECTION HAS BEGUN FOR SIX RESERVATION STREAMS. WELL INVENTORIES, A BASIC GROUND WATER MONITORING PROGRAM, AND COLLECTION OF GROUND WATER QUALITY DATA HAS BEGUN. STRATIGRAPHIC CORRELATION OF THE REGIONAL AND LOCAL GEOLOGY IS COMPLETED AND POTENTIAL DEVELOPMENT PRIORITY AREAS HAVE BEEN SELECTED. DURING THE THIRD BUDGET PERIOD A DESCRIPTION OF POTENTIAL IMPACTS TO THE SURFACE AND GROUND WATER RESOURCES FROM MINING AND A RESERVATION WATER RESOURCES MANAGEMENT PLAN WILL BE PREPARED.

****PROJECT: 00346-EVALUATE SURFACE AND GROUNDWATER AT POTENTIAL STRIP MINE SITES**

STARTING/ COMPLETION DATE : 05/75 - 06/78 : FUNDING : ESTIMATED - FY77 / \$ 482000
TASK CODE=B623B-357 **EPA-R803727-03 ** (GRANT) PRIOR FY76 / \$ 2141000
EPA OFFICER.: TG NEWPORT EPA/IERL - CINC
INVESTIGATOR.: TT WILLIAMS MONTANA STATE UNIV
DG STUART MONTANA COLL OF MIN SCI & TECH
W VANVOAST MONTANA COLL OF MIN SCI & TECH
R KOOB NORTH DAKOTA STATE UNIV
P RICHARD UNIV OF WYOMING

MILESTONES....: 05/75 -FUNDING PACKAGE SUBMITTED
06/75 -AWARD FUNDS FOR PROJECT
07/76 -FUNDING INCREMENT
07/77 -FUNDING INCREMENT
06/78 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
ORDIS CODES...: RECN-000346 SSIE-GMA 3708 EPA -R803727-03 TASK-B623B-357
AP -623B DU -N105 LABT-EMI

ABSTRACT.....: MAJOR OBJECTIVE OF THIS PROJECT IS TO IDENTIFY POSSIBLE IMPACTS OF COAL MINING AND DEVELOPMENT IN THE NORTHERN GREAT PLAINS ON THE SURFACE AND GROUNDWATER SYSTEMS OF THE SURROUNDING AREA. SPECIFIC OBJECTIVES ARE: 1) OBTAIN AN EQUATION OF BALANCE FOR ALL WATER INFLOW AND OUTFLOW IN EACH OF THREE STUDY SITES, ONE EACH IN MONTANA, NORTH DAKOTA AND WYOMING; 2) CHARACTERIZE THE OVERBURDEN FROM A PHYSICAL AND CHEMICAL POINT OF VIEW AS WELL AS DETERMINE ITS RELATIONSHIP TO THE WATER COMING TO THE SURFACE; 3) DETERMINE HYDROLOGIC CHARACTER OF SPOILS AT ACTIVE MINE SITES IN MONTANA; 4) CHARACTERIZE THE CHEMICAL FEATURES OF THE MINED SITES. THE PROPOSED WORK IS A KEY EFFORT IN THE EPA PROGRAM TO ASSESS THE SURFACE AND GROUNDWATER PROBLEMS ASSOCIATED WITH WESTERN COAL. THREE SITES ARE BEING STUDIED COMPREHENSIVELY. EACH SITE IS JUST COMMENCING TO HAVE IMPACT. BASE LINE DATA WERE OBTAINED BEFORE IMPACTS BEGAN. IN ADDITION TO THE SITE-SPECIFIC WORK, SOME DATA ARE BEING COLLECTED AT THE TWO ACTIVE MINING SITES IN MONTANA TO PROVIDE ADDITIONAL DATA FOR THE ANALYSES.

****PROJECT: 00347-VEGETATIVE STABILIZATION OF SPENT OIL SHALE**

STARTING/ COMPLETION DATE : 08/76 - 08/79 : FUNDING : ESTIMATED - FY77 / \$ 10000
 TASK CODE=B623B-358 **EPA=R804719-01 ** (GRANT) PRIOR FY76 / \$ 21000
 EPA OFFICER.: E HARRIS EPA/IERL - CINC
 INVESTIGATOR.: WA BERG COLORADO STATE UNIV SCH OF AGRIC SCI
 MILESTONES.... 08/76 -FUNDING PACKAGE SUBMITTED
 09/76 -AWARD FUNDS FOR PROJECT
 09/77 -AMENDMENT
 00/00 -FINAL REPORT RECEIVED
 PLAN ID..... (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES... RECN-000347 SSIE-GMA 2471 1 EPA -R804719-01 TASK-B623B-358
 AP -623B DU -N105 LABT-EMI

ABSTRACT..... OBJECTIVE: TO INVESTIGATE SURFACE STABILITY AND SALT MOVEMENT IN SPENT OIL SHALES AND SOIL-COVERED SPENT SHALES AFTER A COVER OF NATIVE VEGETATION HAS BEEN ESTABLISHED BY INTENSIVE TREATMENTS AND THEN LEFT UNDER NATURAL PRECIPITATION CONDITIONS. APPROACH: THE STUDY IS BEING CARRIED OUT ON TWO DIFFERENT SPENT OIL SHALES. "SOIL" TREATMENTS ARE PLANT ESTABLISHMENT ON: 1. DIRECTLY ON LEACHED AND FERTILIZED SPENT SHALES; 2. SIX INCHES OF SOIL OVER LEACHED SPENT SHALE; 3. ONE FOOT OF SOIL OVER UNLEACHED SPENT SHALE; 4. SOIL. PLOTS HAVE BEEN ESTABLISHED ON 25 PERCENT NORTH AND SOUTH SLOPES AT ALTITUDES OF 5,700 AND 7,200 FEET IN OR NEAR THE PICEANCE BASIN OF NORTHWESTERN COLORADO. EACH PLOT (28 PER SITE) IS BORDERED WITH WOOD TO FORM INDIVIDUAL RUNOFF PLOTS 11 FEET WIDE AND 22 FEET LONG. SEDIMENT AND RUNOFF CATCHMENTS HAVE YET TO BE INSTALLED. ONE SITE (5,700') HAS BEEN INSTRUMENTED FOR SOIL SALINITY AND SOIL MOISTURE MEASUREMENTS. A COVER OF NATIVE PLANT SPECIES HAS BEEN ESTABLISHED ON THE LOWER ALTITUDE SITE AND WILL BE ESTABLISHED ON THE HIGHER SITE. MEASUREMENTS ON VEGETATION INCLUDE FREQUENCY, DENSITY AND VEGETATIVE GROUND COVER.

****PROJECT: 00348-VEGETATIVE STABILIZATION OF PARAHO SPENT OIL SHALE**

STARTING/ COMPLETION DATE : 07/77 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 69000
 TASK CODE=B623B-359 **EPA=R80378B-03 ** (GRANT) PRIOR FY76 / \$ 128000
 EPA OFFICER.: EF HARRIS EPA/IERL - CINC
 INVESTIGATOR.: WA BERG COLORADO STATE UNIV SCH OF AGRIC SCI
 MILESTONES.... 03/75 -FUNDING PACKAGE SUBMITTED
 07/75 -AWARD FUNDS FOR PROJECT
 07/76 -ANNUAL REPORT
 09/76 -CONTINUATION AWARDED
 12/76 -AMENDMENT
 08/77 -FINAL REPORT RECEIVED
 PLAN ID..... (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES... RECN-000349 SSIE-GMA 2472 2 EPA -R80378B-03 TASK-B623B-359
 AP -623B DU -N105 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THIS RESEARCH PROJECT IS TO STUDY SURFACE STABILITY AND WATER MOVEMENT IN AND THROUGH THE PARAHO SPENT OIL SHALES. IN ADDITION TO THE VEGETATIVE STABILIZATION STUDIES, THE DISTRIBUTIONS OF WATER AND SALTS IN THE PLOTS WILL BE MONITORED WITH THE OBJECTIVE OF QUANTIFYING THE POTENTIAL SALT POLLUTION FROM SHALE RESIDUES. IT IS NOT POSSIBLE TO EXPERIMENTALLY MODEL THE ACTUAL PROTOTYPE DISPOSAL. FOR THIS REASON, DATA FROM PLOT STUDIES WILL BE USED TO DEVELOP AND VERIFY A MATHEMATICAL MODEL OF SALT AND WATER TRANSPORT. THIS MODEL WILL BE USED TO ESTIMATE THE LONG TERM WATER QUALITY ASPECTS OF LARGE SCALE DISPOSAL OF SPENT SHALE RESIDUES.

****PROJECT: 00351-ENVIRONMENTAL MONITORING & ASSESSMENT OF COAL STRIP MINING & RECLAMATION IN THE FOUR CORNER AREA**

STARTING/ COMPLETION DATE : 09/76 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 145000
 TASK CODE=B623B-418 **EPA=R804679-02 ** (GRANT) PRIOR FY76 / \$ 196000
 EPA OFFICER.: JF MARTIN EPA/IERL - CINC
 INVESTIGATOR.: MM FOGEL UNIV OF ARIZONA SCH OF AGRIC
 JL THAMES UNIV OF ARIZONA SCH OF AGRIC
 TR VERMA UNIV OF ARIZONA SCH OF AGRIC
 LH HEKMAN UNIV OF ARIZONA SCH OF AGRIC
 L DUCKSTEIN UNIV OF ARIZONA SCH OF AGRIC
 MILESTONES.... 08/77 -FUNDING PACKAGE SUBMITTED
 09/77 -AWARD FUNDED
 09/78 -AWARD CONTINUATION
 10/79 -FINAL REPORT RECEIVED
 PLAN ID..... (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES... RECN-000351 SSIE-GMA 3267 1 EPA -R804679-02 TASK-B623B-418
 AP -623B DU -N105 LABT-EMI

ABSTRACT..... THE OVERALL OBJECTIVE OF THE PROJECT IS TO DEVELOP CRITERIA FOR THE OPTIMAL MANAGEMENT OF LAND THAT HAS BEEN DISTRIBUTED BY COAL STRIP MINING ACTIVITIES. THE CRITERIA WILL BE BASED ON MINIMIZING AIR AND WATER POLLUTION. SPECIFICALLY, THE SECOND PHASE OF THE PROJECT WILL BE DEVOTED PRINCIPALLY TO MONITORING (1) TWO SELECTED GROUNDWATER BASINS, (2) THREE SURFACE WATER SITES AND (3) THREE AIR QUALITY SITES TO DETERMINE THE EFFECTS OF STRIP MINING ON THE ENVIRONMENT. SEVERAL HOLES WILL BE DRILLED, CAGED AND MONITORED FOR EACH OF THE SHALLOW GROUNDWATER BASINS. INFILTRATION STUDIES WILL BE USED TO ASCERTAIN THE MOBILITY OF POLLUTANTS FROM THE LAND SURFACE TO GROUNDWATER. THE SURFACE WATER SITES WILL INVOLVE BOTH MINED AND UNDISTURBED AREAS AS WELL AS REVEGETATED AREAS WHICH ARE EITHER IRRIGATED OR RAINFED. HIGH VOLUME AIR SAMPLERS WILL BE USED TO MONITOR PARTICULATE CONCENTRATIONS BEFORE, DURING AND AFTER MINING DEVELOPMENT.

****PROJECT: 00353-WATER-QUALITY HYDROLOGY OF SURFACE-MINED WATERSHEDS**

STARTING/ COMPLETION DATE : 09/76 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 39000
 TASK CODE=B623B-419 **EPA-R804673-02 ** (GRANT) PRIOR FY76 / \$ 39000

EPA OFFICER.: RC WILMOTH EPA/IERL - CINC
 INVESTIGATOR.: DB MCWHORTER COLORADO STATE UNIV
 GV SKOGERBOE COLORADO STATE UNIV

MILESTONES...: 09/76 -FUNDING PACKAGE SUBMITTED
 10/76 -AWARD FUNDS FOR PROJECT
 10/77 -CONTINUATION
 09/78 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-000353 SSIE-GMA 3466 EPA -R804673-02 TASK-B623B-419
 AP -623B DU -N105 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THE PROJECT IS TO DEVELOP A MANUAL OF PROCEDURES FOR QUANTITATIVELY ASSESSING THE IMPACT OF INDIVIDUAL SURFACE MINING PROJECTS ON THE WATER RESOURCES IN THE AFFECTED WATERSHED. ONE APPROACH IS TO GATHER ALL PERTINENT DATA THAT IS AVAILABLE AND DETERMINE THE REQUIRED PARAMETERS BY FITTING THE MODEL TO THE DATA. THE SECOND APPROACH IS TO USE A WATERSHED MODEL TO GENERATE "FIELD" DATA FOR A WIDE VARIETY OF HYPOTHETICAL SITUATIONS AND DETERMINE THE REQUIRED PARAMETERS FOR THE SIMPLER MODEL. A CORRELATION BETWEEN THE PARAMETERS AND CONDITIONS SIMULATED BY THE WATERSHED MODEL WILL BE MADE. THE CORE OF THE MANUAL WILL BE A WATER-QUALITY HYDROLOGY MODEL DEVELOPED IN A PREVIOUS PROJECT. THIS MODEL HAS BEEN TESTED SUCCESSFULLY ON FOUR WATERSHEDS PREVIOUSLY, AND WILL BE FURTHER TESTED USING DATA NOW BEING COLLECTED AT MANY LOCATIONS IN THE ROCKY MOUNTAIN REGION. DETAILED PROCEDURES FOR TRANSLATING BASIC WATERSHED OBSERVATIONS INTO THE APPROPRIATE MODEL PARAMETERS WILL BE GIVEN.

****PROJECT: 00354-COREHOLE SPACING MODELS DEFINING POTENTIAL TOXIC ROCK BODIES IN COAL SURFACE MINING**

STARTING/ COMPLETION DATE : 02/77 - 02/79 : FUNDING : ESTIMATED - FY77 / \$ 109000
 TASK CODE=B623B-503 **EPA-R805101-01 ** (GRANT) PRIOR FY76 /

EPA OFFICER.: TG NEWPORT EPA/IERL - CINC
 INVESTIGATOR.: JC HORNE UNIV OF SOUTH CAROLINA SCI & MATH/CHEM DEPT
 JC FERM UNIV OF SOUTH CAROLINA SCI & MATH/CHEM DEPT

MILESTONES...: 01/77 -FUNDING PACKAGE SUBMITTED
 02/77 -AWARD FUNDS FOR PROJECT
 10/78 -FINAL DRAFT REPORT
 02/79 -FINAL REPORT
 03/79 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-000354 SSIE-GMA 3712 EPA -R805101-01 TASK-B623B-503
 AP -623B DU -N105 LABT-EMI

ABSTRACT.....: WITH THE RECENT INCREASE IN STRIP MINING AND THE IMPENDING PASSAGE OF FEDERAL SURFACE MINING LEGISLATION, IT IS IMPERATIVE THAT A COREHOLE SPACING PROGRAM BE DEVELOPED THAT DEFINES THE POTENTIALLY TOXIC SPOIL MATERIALS IN ADVANCE OF SURFACE MINING. ONE OF THE PRODUCTS OF CURRENT RESEARCH IS A COLOR PHOTOGRAPHIC BOOK ILLUSTRATING 28 OF THE STANDARD ROCK TYPES FOUND IN THE COAL MEASURES OF EASTERN KENTUCKY AND SOUTHERN WEST VIRGINIA. BY ASSOCIATING THESE ROCK TYPES WITH THEIR GEOCHEMICAL AND WEATHERING CHARACTERISTICS, THE TOXICITY POTENTIAL OF EACH LITHOLOGY WAS APPRAISED, AND POTENTIAL PROBLEM ROCK TYPES WERE ISOLATED. USING THESE RESULTS AS A BASE, IT IS PROPOSED TO DETERMINE THE SHAPE, THICKNESS, AND LATERAL EXTENT OF THE POTENTIALLY TOXIC ROCK TYPES WITH THE VIEW THAT, IF DIMENSIONS OF SOME OF THESE ROCK BODIES ARE KNOWN, CORE HOLE SPACING REQUIRED TO DELINEATE THE DIMENSIONS OF OTHER SIMILAR BODIES CAN BE DETERMINED. KNOWLEDGE OF THIS TYPE WILL AID IN THE PLANNING FOR HYDRAULIC MANIPULATIONS AND SEGREGATION AND BURIAL OF POTENTIALLY TOXIC MATERIALS DURING OVERBURDEN HANDLING IN SURFACE MINES. THE DATA BASE FOR THE PROPOSED STUDY INCLUDE DETAILED (20' EQUALS 1" VERTICAL, .1 MILE EQUALS 1" HORIZONTAL) GEOLOGIC CROSS SECTIONS OF MORE THAN 400 MILES OF PRE-SPLIT HIGHWAY EXPOSURES AND OVER 5,000 COREHOLE RECORDS IN EASTERN KENTUCKY AND SOUTHERN WEST VIRGINIA. BY COMPARING THE ROCKS FOUND TO BE POTENTIALLY TOXIC IN THE CORE BOOK EXPERIMENT WITH THOSE FOUND IN THE HIGHWAY CUTS AND ADJOINING BORE HOLES IN THE DIMENSIONS OF THE POTENTIALLY PROBLEM ROCKS CAN BE DELINEATED. THE TOXICITY OF THESE ROCK TYPES WILL BE ANALYZED TO DETERMINE THE TYPE AND AMOUNT OF PYRITE AND THE ACIDITY, ALKALINITY, SULFATE CALCIUM, MAGNESIUM ALUMINUM AND IRON CONTENTS OF EFFLUENTS LEACHED FROM THEM. FROM THESE DATA, MODELS WILL BE DEVELOPED TO EVALUATE THE IDEAL CORE HOLE SPACING IN ADVANCE OF MINING THAT IS NECESSARY TO DELINEATE POTENTIALLY TOXIC LITHOLOGIES.

****PROJECT: 00356-AUDIOVISUAL PROGRAM FOR SURFACE COAL MINING AND THE ENVIRONMENT**

STARTING/ COMPLETION DATE : 02/77 - 12/77 : FUNDING : ESTIMATED - FY77 / \$ 88000
 TASK CODE=B623B-504 **EPA-R804972-01 ** (GRANT) PRIOR FY76 /

EPA OFFICER.: JF MARTIN EPA/IERL - CINC
 INVESTIGATOR.: KC BOWLING INTERSTATE MINING COMPACT COMM

MILESTONES...: 11/76 -FUNDING PACKAGE SUBMITTED
 01/77 -AWARD FUNDS FOR PROJECT
 10/77 -DRAFT INTERIM
 11/77 -AWARD SECOND PHASE
 09/78 -FINAL PROGRAM RECEIVED

PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-000356 SSIE-GMA 3714 EPA -R804972-01 TASK-B623B-504
 AP -623B DU -N105 LABT-EMI

ABSTRACT.....: THE INTERSTATE MINING COMPACT COMMISSION PROPOSES TO DEVELOP A COMPREHENSIVE INFORMATIONAL PROGRAM IN AUDIOVISUAL FORMAT ON THE TOPIC OF "SURFACE COAL MINING AND THE ENVIRONMENT." THE PROGRAM WILL CONSIST OF UP TO FOURTEEN (14) INDIVIDUAL TWENTY TO FORTY (20-40) MINUTE AUDIOVISUAL PRESENTATIONS ON THE VARIOUS ENVIRONMENTAL TOPICS AND A TECHNICAL MANUAL KEYED TO THE PRESENTATION. THE TARGET AUDIENCE FOR THE INFORMATION TO BE DEVELOPED WILL BE MINE INSPECTORS, ENVIRONMENTAL TECHNICIAN, MINE FOREMEN, AND MINE OPERATORS.

****PROJECT: 00358-DESIGN AND PERFORMANCE OF HEAD-OF-HOLLOW FILLS--A SURFACE MINING & RECLAMATION METHOD**

STARTING/ COMPLETION DATE : 07/77 - 07/80 : FUNDING : ESTIMATED - FY77 / \$ 67000
 TASK CODE=B623B-505 **EPA-R805272-01 ** (GRANT) PRIOR FY76 /
 EPA OFFICER.: RC WILMOTH EPA/IERL - CINC
 INVESTIGATOR.: GR LAUGHLIN STATE DIV OF SURFACE MINING
 MILESTONES...: 06/77 -FUNDING PACKAGE SUBMITTED
 07/77 -AWARD FUNDS FOR PROJECT
 07/78 -AWARD CONTINUATION
 07/79 -AWARD CONTINUATION
 07/80 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: RECN-000358 SSIE-GMA 3733 EPA -R805272-01 TASK-B623B-505
 AP -623B DU -N105 LABT-EMI
 ABSTRACT.....: THE OBJECTIVE IS TO DESIGN AND CONSTRUCT HEAD-OF-HOLLOW FILLS USING ECONOMIC ENGINEERING CRITERIA AND TO DETERMINE THE EFFECTS OF THIS MINING/RECLAMATION METHOD ON THE ENVIRONMENT. THE STUDY INVOLVES MONITORING ENVIRONMENTAL PARAMETERS PRIOR TO DISTRIBUTION, DURING DISTURBANCE, AND AFTER COMPLETION OF CONSTRUCTION. THE PROGRAM WILL INVOLVE HILL-TOP REMOVAL AND VALLEY FILLS, EACH OF VARYING DESIGN. COST ANALYSES WILL BE CONDUCTED FOR EACH FILL DESIGN. SOILS ENGINEERING PARAMETERS INCLUDING SETTLEMENT AND STABILITY WILL BE DETERMINED AND ANALYZED DURING AND AFTER CONSTRUCTION.

****PROJECT: 00359-USE OF A VEGETATIVE FILTER ZONE TO CONTROL FINE-GRAINED SEDIMENTS FROM SURFACE MINES**

STARTING/ COMPLETION DATE : 11/77 - 05/79 : FUNDING : ESTIMATED - FY77 / \$ 119000
 TASK CODE=B623B-506 **EPA-S805632-01 ** (GRANT) PRIOR FY76 /
 EPA OFFICER.: E BATES EPA/IERL - CINC
 INVESTIGATOR.: RE NICKEL HITTMAN ASSOCIATES INC
 B FISH DEPT OF NAT RES & ENV PROT
 BJ BARFIELD UNIVERSITY OF KENTUCKY
 CT HAAN UNIVERSITY OF KENTUCKY
 MILESTONES...: 08/77 -FUNDING PACKAGE SUBMITTED
 09/77 -AWARD FUNDS FOR PROJECT
 01/78 -PLANNING AND FEASIBILITY STUDY
 04/79 -CONSTRUCTION & DATA COLLECTION
 05/79 -FINAL REPORT
 PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: RECN-000359 SSIE-GMA 3729 EPA -S805632-01 TASK-B623B-506
 AP -623B DU -N105 LABT-EMI
 ABSTRACT.....: PRIMARY OBJECTIVE OF THE PROJECT IS TO DEMONSTRATE THE TECHNICAL, THE ECONOMIC AND ENVIRONMENTAL FEASIBILITY OF USING A VEGETATIVE FILTER ZONE TO ASSIST IN CONTROLLING FINE-GRAINED SEDIMENTS ORIGINATING FROM SURFACE MINING ACTIVITIES. SPECIFIC OBJECTIVES INCLUDE: (1) EXAMINE SEDIMENT TRAPPING EFFICIENCY OF THE FILTER ZONE, (2) EXAMINE SUITABILITY OF VARIOUS TYPES OF VEGETATION FOR USE IN THE FILTER ZONE, (3) EVALUATE THE FILTER'S USEFULNESS IN IMPROVING WATER QUALITY, AND (4) DETERMINE THE COST FEASIBILITY OF USING THE FILTER ON SURFACE MINES IN EASTERN KENTUCKY. BASICALLY, THE PROJECT WILL ENTAIL THE DIVERSION OF SURFACE RUNOFF WATER, WHICH HAS BEEN COLLECTED AT A PARTICULAR POINT ON THE MINING SITE, DOWN A RIPRAP LINED CHANNEL AND THROUGH A VEGETATIVE FILTER ZONE APPROXIMATELY 20 FEET WIDE AND 200 FEET LONG. IN ORDER TO ASSURE THAT RUNOFF IS ACCURATELY MONITORED, A BERM WILL BE CONSTRUCTED AROUND THE PROJECT SITE. A FLOW DISTRIBUTION AREA AND A LEVEL SPREADER WILL BE INSTALLED BELOW THE RIPRAP LINED CHANNEL AND ABOVE THE FILTER ZONE. THE PROJECT WILL INCLUDE FOUR TASKS: (1) PLANNING AND FEASIBILITY STUDY, (2) SEDIMENT AND WATER QUALITY MONITORING, (3) CONSTRUCTION AND DEMONSTRATION, AND (4) PROJECT MANAGEMENT.

****PROJECT: 00360-DETERMINE THE EFFECTIVENESS OF REGULATIONS AND PRACTICES FOR HANDLING TOXIC STRIP MINE SPOILS TO PREVENT ACID MINE DRAINAGE**

STARTING/ COMPLETION DATE : 09/77 - 03/79 : FUNDING : ESTIMATED - FY77 / \$ 112500
 TASK CODE=B623B-508 **EPA-R805598-01 ** (GRANT) PRIOR FY76 /
 EPA OFFICER.: JL KENNEDY EPA/IERL - CINC
 INVESTIGATOR.: DR THOMPSON STATE BUR OF SURFACE MINE RES
 MT DOUGHERTY ACKENHEIL & ASSOC GEO SYS
 MILESTONES...: 08/77 -FUNDING PACKAGE SUBMITTED
 09/77 -AWARD FUNDS FOR PROJECT
 09/78 -AWARD CONTINUATION
 03/79 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: RECN-000360 SSIE-GMA 3735 EPA -R805598-01 TASK-B623B-508
 AP -623B DU -N105 LABT-EMI
 ABSTRACT.....: THE OBJECTIVE OF THE PROPOSED RESEARCH PROJECT IS TO DETERMINE IF MODERN REGULATIONS AND PRACTICES GOVERNING HANDLING OF TOXIC STRIP MINE SPOIL MATERIALS HAVE BEEN EFFECTIVE IN CONTROLLING ACID MINE DRAINAGE AFTER MINING AND RECLAMATION HAVE BEEN COMPLETED. THE PROJECT WILL INCLUDE THE EVALUATION OF SIXTEEN STRIP MINES IN THE COMMONWEALTH OF PENNSYLVANIA. THESE MINES WILL HAVE BEEN RECLAIMED FOLLOWING LAWS AND REGULATIONS WHICH REQUIRED THAT TOXIC SPOIL MATERIALS BE SEGREGATED DURING MINING AND THAT THE TOXIC MATERIAL BE BACKFILLED IN ACCORDANCE WITH SPECIFICATIONS DESIGNED TO PREVENT RESIDUAL ACID MINE DRAINAGE. SPOIL SAMPLES WILL BE OBTAINED FROM A TEST BORING PROGRAM. THE POTENTIAL TOXICITY OF THE SPOIL SAMPLES WILL BE DETERMINED BY LABORATORY ANALYSIS. STATISTICAL METHODS WILL BE USED TO DETERMINE THE RELATION BETWEEN ACID MINE DRAINAGE PRODUCTION AND THE PRESENCE OF TOXIC STRIP MINE SPOILS, THEIR CONFIGURATION WITHIN THE RECLAIMED STRIP MINE, AND THE LOCATION OF GROUND WATER WITH RESPECT TO THE TOXIC MATERIALS.

****PROJECT: 00382-USER DESIGN MANUAL FOR TREATMENT OF ACID MINE DRAINAGES**

STARTING/ COMPLETION DATE : 06/77 - 04/78 : FUNDING : ESTIMATED - FY77 / \$ 55000
 TASK CODE=B623B-512 **EPA=68-03-2599 ** (CNTR.) PRIOR FY76 /
 EPA OFFICER.: RC WILMOTH EPA/IERL - CINC
 INVESTIGATOR.: UNKNOWN SYSTEMS TECHNOLOGY CORP
 MILESTONES...: 04/77 -FUNDING PACKAGE SUBMITTED
 06/77 -AWARD FUNDS FOR PROJECT
 01/78 -FINAL REPORT
 04/78 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-N-000362 SSIE-GMA 4633 EPA -68-03-2599 TASK-B623B-512
 AP -623B DU -N105 LABT-EMI

ABSTRACT.....: THE PURPOSE OF THIS PROGRAM IS TO DEVELOP A USER DESIGN MANUAL WHICH WILL PRESENT DETAILED STEP-BY-STEP DESIGN PROCEDURES AND DESIGN FACTORS FOR NEUTRALIZATION PROCESSES TO TREAT AMD. THE APPLICABILITY OF EACH TREATMENT PROCESS WILL BE CONSIDERED IN TERMS OF INFLUENT AND EFFLUENT CONDITIONS, LIMITING PARAMETERS GOVERNING THE SELECTION OF THESE PROCESSES AND ADVANTAGES AND DISADVANTAGES OF EACH. A REVIEW OF ALL APPLICABLE LITERATURE ON THE TREATMENT OF ACID MINE DRAINAGE (AMD) WILL BE MADE. THE TREATMENT FACTORS AND PROCEDURES WILL BE OBTAINED FROM THE LITERATURE. WHERE ADEQUATE INFORMATION ON A SPECIFIC UNIT PROCESS MAY NOT EXIST, AN OBJECTIVE RECOMMENDATION WILL BE MADE FOR SUCH FACTORS BASED UPON THE APPLICATION OF SOUND ENGINEERING PRINCIPLES AND/OR KNOWLEDGE OF THE APPLICABILITY OF THE SUBJECT PARAMETER IN A RELATED WASTE TREATMENT PROCESS. A SECTION OF THE USER MANUAL SHALL DETAIL THE RELATIVE CAPITAL AND OPERATING COSTS OF ALL PROCESSES GIVEN TWO SETS OF INFLUENT WATER QUALITY AND THREE PLANT SIZES (P.5, 1.0, AND 10 MGD).

****PROJECT: 00383-ROTATING DISC BIOLOGICAL TREATMENT OF AMD**

STARTING/ COMPLETION DATE : 04/77 - 04/78 : FUNDING : ESTIMATED - FY77 / \$ 63000
 TASK CODE=B623B-514 **EPA=R805132-01 ** (GRANT) PRIOR FY76 /
 EPA OFFICER.: RG WILMOTH EPA/IERL - CINC
 INVESTIGATOR.: RF UNZ PENNSYLVANIA STATE UNIV
 H OLEM PENNSYLVANIA STATE UNIV
 MILESTONES...: 03/77 -FUNDING PACKAGE SUBMITTED
 04/77 -AWARD FUNDS FOR PROJECT
 04/78 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-N-000363 SSIE-GMA 3710 EPA -R805132-01 TASK-B623B-514
 AP -623B DU -N105 LABT-EMI

ABSTRACT.....: THE PROJECT IS CONCERNED WITH EVALUATING THE FERROUS (FEII) IRON OXIDIZING CAPACITY OF THE ROTATING BIOLOGICAL CONTACTOR IN THE TREATMENT OF ACID MINE DRAINAGE. THE PROCESS IS DEPENDENT UPON THE LITHOTROPHIC CAPACITY OF IRON-OXIDIZING BACTERIA WHICH COLONIZE THE AVAILABLE SURFACE AREA OF ROTATING DISCS IMMERSSED IN ACID MINE WATER FLOWING THROUGH THE RBC UNIT. THE OXIDATION OF THE FERROUS IRON TO THE FERRIC STATE REDUCES THE POLLUTION POTENTIAL OF THE DRAINAGE. THE SPECIFIC OBJECTIVES OF THE PROJECT ARE TO DETERMINE THE TREATMENT OF MINE DRAINAGES OF DIFFERING CHEMICAL NATURE AND THE REQUIREMENTS FOR TREATMENT OF CERTAIN SPECIFIC DRAINAGES BY THE UNIT TO ACCOMPLISH DESIRED EFFLUENT QUALITY. A FULL-SIZE RBC TREATMENT UNIT, WITH 2 METER DIAMETER DISCS, WILL BE SPECIALLY MODIFIED FOR DEMONSTRATION PURPOSES AND OPERATED AT THREE FERROUS IRON-CONTAINING ACID MINE DRAINAGE LOCATIONS. THESE LOCATIONS ARE IN PENNSYLVANIA AND WEST VIRGINIA AND INCLUDE ONE ACTIVE AND TWO ABANDONED COAL MINES. PERTINENT WATER QUALITY PARAMETERS WILL BE ANALYZED TO DETERMINE THE EFFECTIVENESS OF THE UNIT. PARTICULAR ATTENTION WILL BE PAID TO THE POPULATION DYNAMICS OF THE IRON OXIDIZING ORGANISMS AT VARIOUS STAGES OF TREATMENT. ANALYTICAL DATA WILL BE UTILIZED TO AID IN THE DESIGN OF OTHER UNITS AND THE ASSESSMENT OF CAPITAL AND OPERATING COSTS. ECONOMICS OF THE UNIT WILL BE COMPARED TO THOSE OF OTHER IRON OXIDIZING PROCESSES IN USE OR PLANNED.

****PROJECT: 00384-THE IMPORTANCE AND FUNCTIONS OF ALLUVIAL VALLEY FLOORS**

STARTING/ COMPLETION DATE : 06/77 - 02/80 : FUNDING : ESTIMATED - FY77 / \$ 110000
 TASK CODE=B623B-517 **EPA=R805185-01 ** (GRANT) PRIOR FY76 /
 EPA OFFICER.: JF MARTIN EPA/IERL - CINC
 INVESTIGATOR.: PA RECHARD UNIVERSITY OF WYOMING
 MILESTONES...: 06/77 -FUNDING PACKAGE SUBMITTED
 07/77 -AWARD FUNDS FOR PROJECT
 08/78 -AWARD CONTINUATION
 02/80 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-N-000364 SSIE-GMA 3661 EPA -R805185-01 TASK-B623B-517
 AP -623B DU -N105 LABT-EMI

ABSTRACT.....: THERE ARE BASICALLY FIVE OBJECTIVES FOR THE STUDY: (1) TO DEFINE THE MECHANISMS INVOLVED IN THE HYDROLOGY OF THE ALLUVIAL SYSTEM, (2) TO INVESTIGATE THE STRATIGRAPHIC RELATIONSHIP OF THE STREAM DEPOSITS, (3) TO IDENTIFY THE SOIL TYPES REPRESENTED, (4) TO DETERMINE REPRODUCTIVITY OF THE NATIVE PLANT COMMUNITY, AND (5) TO PROVIDE INFORMATION RELEVANT FOR STATE AND FEDERAL REGULATORY AGENCIES. IT IS INTENDED THAT THIS STUDY DELINEATE THE PROBLEMS, MINEABILITY, TREATABILITY, ETC. OF POTENTIAL ALLUVIAL VALLEY MINE SITES. THIS EFFORT IS TO DEFINE THE CRITICALLY IMPORTANT PHYSICAL FEATURES OF ALLUVIAL VALLEYS WHICH HAVE MAJOR IMPACTS TO THE HYDROLOGIC CYCLE. AFTER AN EXTENSIVE LITERATURE REVIEW, THREE SITES IN MONTANA AND WYOMING WILL BE SELECTED FOR FIELD STUDY.

****PROJECT: 00386-TRACE AND POTENTIALLY TOXIC ELEMENTS ASSOCIATED WITH URANIUM DEPOSITS IN**

SOUTH TEXAS

STARTING/ COMPLETION DATE : 05/77 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 60000
TASK CODE=B623B-523 **EPA=R805147-01 ** (GRANT) PRIOR FY76 /
EPA OFFICER.: SJ HUBBARD EPA/IERL - CINC
INVESTIGATOR.: CD HENRY UNIV OF TEXAS
CG Groat UNIV OF TEXAS
BUR OF ECONOMIC GEOLOGY
BUR OF ECONOMIC GEOLOGY

MILESTONES...: 04/77 -FUNDING PACKAGE SUBMITTED

05/77 -AWARD FUNDS

07/78 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
ORDIS CODES...: RECN-000366 SSIE-GMA 4398 EPA -R805147-01 TASK-B623B-523
AP -623B DU -N105 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS STUDY IS TO EVALUATE POTENTIAL PROBLEMS OF TOXIC ELEMENTS ASSOCIATED WITH URANIUM MINERALIZATION AND MINING IN SOUTH TEXAS. SAMPLING OF SOILS AND VEGETATION IN (1) AREAS THAT ARE WITHIN OR IMMEDIATELY ADJACENT TO MINING AREAS OR HAVE HAD ORE STORED ON THEM; (2) AREAS UNDERLAIN BY IDENTIFIED URANIUM MINERALIZATION BUT WHICH HAVE NOT BEEN MINED; AND (3) AREAS OF SIMILAR SUBSTRATE AND SOILS AWAY FROM ANY KNOWN MINERALIZATION OR PREVIOUS MINING WILL ACCOMPLISH THIS OBJECTIVE. THE THIRD LOCALITY WILL ESTABLISH BACKGROUND LEVELS; THE FIRST TWO WOULD INDICATE THE EXTENT OF MAN-CAUSED OR "NATURAL" CONTAMINATION. SAMPLING WILL BEGIN EARLY IN 1977.

****PROJECT: 00387-TRANSPORT WATER CONTAMINATION IN COAL-SLURRY PIPELINES**

STARTING/ COMPLETION DATE : 03/77 - 04/78 : FUNDING : ESTIMATED - FY77 / \$ 80000
TASK CODE=B623B-525 **EPA=R805176-01 ** (GRANT) PRIOR FY76 /
EPA OFFICER.: JL KENNEDY EPA/IERL - CINC
INVESTIGATOR.: HS PEAVY MONTANA STATE UNIV
WA HUNT MONTANA STATE UNIV
PW JENNINGS MONTANA STATE UNIV

MILESTONES...: 03/77 -FUNDING PACKAGE SUBMITTED

04/77 -AWARD FUNDS FOR PROJECT

08/77 -COMPLETE FIRST PUMP TESTS

04/78 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
ORDIS CODES...: RECN-000367 SSIE-GMA 3711 EPA -R805176-01 TASK-B623B-525
AP -623B DU -N105 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS RESEARCH PROJECT WILL BE TO QUALIFY AND QUANTIFY ANY CONTAMINATION OF WATER USED AS A TRANSPORT MEDIA IN COAL-SLURRY PIPELINES. A SLURRY OF WATER AND COAL WILL BE PUMPED CONTINUOUSLY FOR SEVERAL DAYS AROUND A 2,400 FOOT, CLOSED LOOP PIPELINE. SAMPLES WILL BE DRAWN OFF PERIODICALLY AND ANALYSIS WILL BE PERFORMED ON THE WATER PHASE FOR VARIOUS DISSOLVED AND SUSPENDED MATERIAL. TEST PARAMETERS WILL BE DETERMINED BY PRIOR ANALYSIS OF THE COAL AND WATER USED TO MAKE UP THE SLURRY. IT IS ANTICIPATED THAT THESE PARAMETERS WILL INCLUDE SEVERAL METALS AS WELL AS SEVERAL ORGANIC CARBON COMPOUNDS. BOTH FRESH WATER AND SALINE WATER WILL BE USED AS A TRANSPORT MEDIA. SOME ORGANIC ANALYSIS OF WATER WHICH HAS CONTRACTED COAL HAS ALREADY BEEN DONE AT M.S.U. THIS WORK INDICATES THAT DISSOLVED ORGANIC CARBON OF UP TO 100 PPM CAN RESULT UNDER SOME CONDITIONS.

****PROJECT: 00388-EVALUATION OF 3 PERMEABLE LIMESTONE SEALS VIA CONSTRUCTION OF 3 EARTHEN**

DAMS

STARTING/ COMPLETION DATE : 11/76 - 11/80 : FUNDING : ESTIMATED - FY77 / \$ 19000
TASK CODE=B623B-574 **EPA= ** (IN-HO) PRIOR FY76 /
IN-HOUSE EFFORT : FY 77 / 00.1 YEARS : TOTAL PROJECT 00.3
EPA OFFICER.: RB SCOTT EPA/IERL - CINC
INVESTIGATOR.: RB SCOTT US EPA
ORD/IERL

MILESTONES...: 11/76 -FUNDING PACKAGE SUBMITTED

11/76 -AWARD FUNDS

11/80 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
ORDIS CODES...: RECN-000368 SSIE-ZMA 1339 TASK-B623B-574 AP -623B
DU -N105 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO DEMONSTRATE MINE SEALING BY PNEUMATICALLY INJECTING LIMESTONE (1/2" X 0") INTO ABANDONED DRIFT MINE PORTALS. THE LIMESTONE (CACO3) IN THE SEAL WILL REACT WITH THE ACID WATER TO NEUTRALIZE ACIDITY AND PRECIPITATE FERRIC AND ALUMINUM HYDROXIDES THAT WILL TEND TO PLUG THE VOIDS BETWEEN THE STONE AND PREVENT WATER FLOW FROM THE MINE. THE CURRENT PHASE OF THE PROJECT INVOLVES EVALUATION OF THE MINE SEALS BY EXTERNAL FLOODING. EXTENSIVE MONITORING IS BEING CONDUCTED TO DETERMINE THE EXTENT OF FLOODING INSIDE THE MINE AREA, AND THE VOLUME OF WATER PERCOLATING THROUGH THE LIMESTONE SEALS.

****PROJECT: 00389-PREDICTING ACID POLLUTION POTENTIAL FROM COAL STRIP MINES**

STARTING/ COMPLETION DATE : 04/77 - 02/79 : FUNDING : ESTIMATED - FY77 / \$ 86000
 TASK CODE=B623B-606 **EPA-R805116-01 ** (GRANT) PRIOR FY76 / \$
 EPA OFFICER.: TG NEWPORT EPA/IERL - CINC
 INVESTIGATOR.: FT CARUCCIO UNIV OF SOUTH CAROLINA SCI & MATH/CHEM DEPT
 MILESTONES....: 04/77 -FUNDING PACKAGE SUBMITTED
 05/77 -AWARD FUNDS FOR PROJECT
 02/79 -FINAL REPORT

PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-000369 SSIE-GMA 3706 EPA -R805116-01 TASK-B623B-606
 AP -623B DU -N105 LABT-EMI

ABSTRACT.....: IF AN ACIDITY INDEX CAN BE DEVELOPED WITH A REASONABLE DEGREE OF PRECISION, THE INFORMATION WILL BE VERY VALUABLE TO MINING OPERATORS AND REGULATORY OFFICIALS IN THAT THEY WILL HAVE A TOTAL WHICH CAN BE USED TO ACCURATELY PREDICT THE AMOUNT OF ACID POLLUTION TO BE EXPECTED FROM A SITE PROPOSED FOR SURFACE MINING. THIS WILL BE USEFUL IN DETERMINING WHETHER A MINE PERMIT SHOULD BE ISSUED AND IN REVIEWING THE PROPOSED MINING OPERATION TO SEE IF PROPER RECLAMATION PRACTICES ARE EMPLOYED. SIX PROPOSED STRIP MINES UNDERLAIN BY DIFFERENT GEOLOGIES IN THE BITUMINOUS COAL FIELD OF WESTERN PENNSYLVANIA WILL BE CORE DRILLED TO PROVIDE FRESH ROCK SAMPLES, DETAILED GEOLOGY AND GROUND WATER SAMPLING POINTS. THE ROCKS WILL BE RELATED TO THEIR ACID-ALKALINITY PRODUCTION POTENTIALS THROUGH LABORATORY SIMULATED WEATHERING CONDITIONS AND PETROGRAPHIC ANALYSES. THE LEACHATES WILL BE ANALYZED FOR SPECIFIC IONIC SPECIES INDICATIVE OF PARTICULAR CHEMICAL REACTIONS. A REGIONAL AQUEOUS GEOCHEMICAL SURVEY WILL BE COMPLETED TO EVALUATE THE NATURAL SYSTEM'S NEUTRALIZING AND BUFFERING CAPACITIES. DURING THE BACKFILLING PHASE OF MINING OPERATION, WATER COLLECTORS WILL BE BURIED IN THE BACKFILL AND MINE DRAINAGE CHARACTERISTICS MONITORED. THE CHEMICAL CHARACTERISTICS OF THE MINE DRAINAGE WILL THEN BE RELATED TO THOSE OF THE LEACHATE TO ASCERTAIN THE CHEMICAL REACTIONS TAKING PLACE. FURTHER IDENTIFICATION WITH THE PETROGRAPHIC ANALYSES AND PYRITE TYPES OF THE ROCKS OCCUPYING THE MINE SITE AND NOTED TO PRODUCE PARTICULAR ACID-ALKALINE LOADS, PERMITS THE EXTENSIONS OF THIS POLLUTION PREDICTIVE TECHNIQUE TO OTHER AREAS.

****PROJECT: 00371-ACTIVITIES ASSOCIATED WITH ENERGY RESOURCE EXTRACTION**

STARTING/ COMPLETION DATE : 01/75 - 06/82 : FUNDING : ESTIMATED - FY77 / \$ 973000
 TASK CODE=B623B-622 **EPA-D6-E764 ** (IAG) PRIOR FY76 / \$ 1254000
 EPA OFFICER.: RD HILL EPA/IERL - CINC
 INVESTIGATOR.: H BRAUN USDA FOREST SERV
 MILESTONES....: 01/75 -FUNDING PACKAGE SUBMITTED AND FUNDS AWARDED

12/77 -TECHNICAL HANDBOOK ON EASTERN U.S. REVEGETATION
 06/78 -GUIDELINES ON OVERBURDEN DRILLING
 06/80 -FINAL REPORT ON REVEGETATION GUIDELINES - SEMI-ARID
 06/80 -FINAL REPORT ON REVEGETATION GUIDELINES - ARID
 06/80 -REPORT EFFECTS TRANSPORTATION SYSTEMS
 06/79 -REPORT ASSESS QUALITY WATER IN STRIP MINES
 06/80 -REPORT ASSESS TECHNOLOGIES FOR REDEPOSITING AND STABILIZING
 06/80 -REPORT CRITERIA USE NONMINE WASTE

PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-000371 SSIE-GMA 4404 EPA -D6-E764 TASK-B623B-622
 AP -623B DU -N105 LABT-EMI

ABSTRACT.....: THIS PROGRAM IS TO DEVELOP ASSESSMENT AND GUIDELINE REPORTS FOR COAL MINING IN BOTH THE HUMID EASTERN STATES AND THE ARID AND SEMI-ARID WESTERN STATES. THE WORK IS DIVIDED INTO FOUR TASKS UNDERTAKEN BY FOREST SERVICE PERSONNEL IN BERE, KY., LOGAN, UTAH, AND ALBUQUERQUE, N.M. THE TASKS ARE AS FOLLOWS: 1. DEVELOP GUIDELINES AND CRITERIA FOR OVERBURDEN DRILLING, ANALYSIS, AND PLACEMENT AS RELATED TO GROWTH SUPPORTING MEDIA. 2. PREPARE TECHNICAL HANDBOOK ON REVEGETATION METHODS FOR MINED LANDS IN EASTERN U.S., INCLUDING RECOMMENDATIONS FOR NEW RESEARCH. 3. DEVELOP GUIDELINES AND CRITERIA FOR THE USE OF NON-MINE WASTES AS SOIL AMENDMENTS ON COAL AND OIL SHALE SPOILS. 4. DEVELOP RECOMMENDATIONS, GUIDELINES, AND CRITERIA, BASED ON NEW RESEARCH, FOR REVEGETATION FOLLOWING COAL AND OIL SHALE MINING.

****PROJECT: 00372-GEOCHEMISTRY OF CADMIUM AND OTHER SELECTED HEAVY METALS AS RELATED TO COAL STRIP MINING**

STARTING/ COMPLETION DATE : 09/77 - 09/79 : FUNDING : ESTIMATED - FY77 / \$ 27000
 TASK CODE=B623B-633 **EPA=R805353-01 ** (GRANT) PRIOR FY76 /

EPA OFFICER.: RC WILMOTH EPA/IERL - CINC
 INVESTIGATOR.: W HOOD SOUTHERN ILLINOIS UNIV SCH OF SCI
 P ROBINSON SOUTHERN ILLINOIS UNIV SCH OF SCI

MILESTONES....: 08/77 -FUNDING PACKAGE SUBMITTED
 09/77 -AWARD FUNDS
 12/77 -REVIEW SAMPLING & ANALYSIS PLAN
 01/78 -AWARD CONTINUATION
 09/79 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-N-000372 SSIE-GMA 4399 EPA -R805353-01 TASK-B623B-633
 AP -623B DU -N105 LABT-EMI

ABSTRACT.....: THIS INVESTIGATION IS CONCERNED WITH THE POTENTIAL RELEASE OF CADMIUM AND OTHER TOXIC HEAVY ELEMENTS (ARSENIC, ANTIMONY, NICKEL, COBALT, ZINC, AND CHROMIUM) TO SOUTHERN ILLINOIS STREAMS AS A RESULT OF THE STRIP MINING OF COAL. PRELIMINARY DATA INDICATE THAT SIGNIFICANT AMOUNTS OF TOXIC HEAVY ELEMENTS CAN BE LEACHED BY ACID MINE WATER BUT THE FATE OF THESE ELEMENTS AFTER THEY ENTER THE AQUATIC ENVIRONMENT IS NOT KNOWN. HOWEVER, PRELIMINARY INFORMATION INDICATES THAT DANGEROUS CONCENTRATIONS OF THESE ELEMENTS MAY POSSIBLY BE TRANSPORTED DOWNSTREAM AS PART OF THE BEDLOAD. PERHAPS TO BE AGAIN RELEASED WHEN FAVORABLE CONDITIONS ARISE. OUR STUDY SITE WILL BE A SIX-COUNTY AREA IN SOUTHERN ILLINOIS. ONE OF THE MOST EXTENSIVELY STRIP-MINED AREAS IN THE WORLD. OUR PROPOSED STUDY WILL BE DIVIDED INTO THREE SEPARATE PARTS: (1) REGIONAL AND STRATIGRAPHIC DISTRIBUTION OF THE ELEMENTS IN MINE OVERBURDEN MATERIALS. (2) LEACHING STUDIES ON THE REMOVAL OF THE ELEMENTS FROM OVERBURDEN ROCKS AND (3) DISTRIBUTION OF THE ELEMENTS IN SELECTED STREAMS AND STREAM SEDIMENTS IN THE AREA. OUR RESULTS WILL ESTABLISH THE EXTENT OF CADMIUM AND OTHER HEAVY ELEMENT POLLUTION RESULTING FROM SOUTHERN ILLINOIS COAL STRIP MINING OPERATIONS. ESTABLISH THE CAUSES, AND PROVIDE THE INFORMATION NEEDED FOR ITS PREVENTION.

****PROJECT: 00374-PREDICTING RESPONSE OF A NATURAL SYSTEM TO URANIUM EXTRACTION, OAKVILLE AQUIFER SYSTEM, TEXAS**

STARTING/ COMPLETION DATE : 09/77 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 105000
 TASK CODE=B623B-638 **EPA=R805357-01 ** (GRANT) PRIOR FY76 /

EPA OFFICER.: J HUBBARD EPA/IERL - CINC
 INVESTIGATOR.: WE GALLOWAY UNIV OF TEXAS BUR OF ECONOMIC GEOLOGY
 CD HENRY UNIV OF TEXAS BUR OF ECONOMIC GEOLOGY
 CW KREITLER UNIV OF TEXAS BUR OF ECONOMIC GEOLOGY

MILESTONES....: 07/77 -FUNDING PACKAGE SUBMITTED
 09/77 -AWARD FUNDS FOR PROJECT
 00/00 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-N-000374 SSIE-GMA 3731 EPA -R805357-01 TASK-B623B-638
 AP -623B DU -N105 LABT-EMI

ABSTRACT.....: THE PRINCIPAL OBJECTIVE OF THIS PROJECT IS TO DETERMINE AND DOCUMENT FOR ONE URANIUM-BEARING AQUIFER SYSTEM THE INTERRELATIONSHIPS BETWEEN AQUIFER GEOMETRY, HYDROLOGY, HYDROCHEMISTRY, MINERALOGY, AND URANIUM MINERALIZATION AND TO DETERMINE HOW THIS NATURAL SYSTEM WILL RESPOND TO LOCAL CHEMICAL OR PHYSICAL STRESSES INDUCED BY URANIUM MINING. THE IMPLICATIONS OF PROJECT RESULTS FOR THE DESIGN OF MONITORING SYSTEMS WILL BE EVALUATED. THE PROGRAM IS EXPECTED TO BE STARTED IN 1977.

****PROJECT: 03998-TECHNOLOGIES FOR CONTROLLING ADVERSE EFFECTS OF MINING ON FOREST, RANGE, AND RELATED FRESHWATER ECOSYSTEMS**

STARTING/ COMPLETION DATE : 00/75 - 00/79 : FUNDING : ESTIMATED - FY77 / \$ 460000
 TASK CODE=V623B-13 **EPA=D5-E764 ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HDQTRS- OEMI AGRIC RES SERV
 INVESTIGATOR.: UNKNOWN USDA

MILESTONES....: 06/78 -OVERBURDEN DRILLING FOR PRE-MINING CHARACTERIZATION REPORT
 PLAN ID.....: (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES...: REC-N-000398 SSIE-GMA 4671 EPA -D5-E764 TASK-V623B-13
 AP -623B DU -N105 LABT-EMI

ABSTRACT.....: DEVELOP GUIDELINES AND CRITERIA FOR OVERBURDEN DRILLING, ANALYSIS, AND PLACEMENT AS RELATED TO GROWTH SUPPORTING MEDIA. PREPARE TECHNICAL HANDBOOK ON VEGETATION METHODS FOR MINED LANDS IN EASTERN U.S., INCLUDING RECOMMENDATIONS FOR NEW RESEARCH. DEVELOP GUIDELINES AND CRITERIA FOR THE USE OF NON-MINE WASTES AS SOIL AMENDMENTS ON COAL AND OIL SHALE SPOILS. DEVELOP RECOMMENDATIONS, GUIDELINES, AND CRITERIA, BASED ON NEW RESEARCH, FOR REVEGETATION FOLLOWING COAL AND OIL SHALE MIN

****PROJECT: 03999-REVEGETATION AND RECLAMATION OF LAND AREAS DISTURBED BY MAN - CONTROLLED TECHNOLOGY**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 200000
 TASK CODE=V623B-23 **EPA=D7-E763 ** (IAG) PRIOR FY76 / \$ 707000
 EPA OFFICER.: CW HALL EPA/HDRS- OEMI
 INVESTIGATOR.: DL BENNETT USDA
 RF FOLLETT USDA AGRIC RES SERV
 PLAN ID..... (AP-623B)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, SOLID FOSSIL FUELS
 ORDIS CODES... REC-003999 SSIE-GMA 4669 EPA -D7-E763 TASK-V623B-23
 AP -623B DU -N105 LABT-EMI

ABSTRACT..... OBJECTIVES: A) TO UTILIZE WASTE MATERIALS IN REVEGETATION AND RECLAMATION OF STRIP MINE AREAS, B) TO DEVELOP METHODS FOR CONTROL OF INSTABILITY OF MINED LANDS, AND C) TO RESTORE AND MAINTAIN A FAVORABLE SOIL ORGANIC MATTER COMPONENT IN RECLAIMED STRIP MINE AREAS. APPROACH: GREENHOUSE, GROWTH-CHAMBER, AND FIELD EXPERIMENTS ARE CONDUCTED TO DETERMINE THE EFFECTS OF VARIOUS TREATMENTS AND PRACTICES. HYPOTHESES ARE TESTED USING FIELD PLOT AND OTHER EXPERIMENTAL TECHNIQUES TO DETERMINE THE EFFECTS OF TREATMENTS AND PRACTICES SO THAT PLANNERS, MINE OPERATORS AND OTHERS CAN USE THIS INFORMATION AS NEEDED. CURRENT PLANS AND/OR PROGRESS: FIELD AND GREENHOUSE STUDIES ARE BEING CONDUCTED TO EVALUATE THE EFFECT OF AN ARRAY OF TYPES AND RATE OF WASTE PRODUCTS ON THE CHEMICAL STATUS OF SPOILS AND ON VEGETATIVE GROWTH. REGARDING TECHNIQUES, AMENDMENT INCORPORATION, AND REVEGETATION PRACTICES ARE BEING DETERMINED THAT WILL ALLEVIATE INSTABILITY OF MINED LANDS. STUDIES ARE BEING CONDUCTED TO SELECT AND DETERMINE MANAGEMENT PRACTICES FOR THOSE LEGUMES MOST TOLERANT TO STRIP-MINED AREAS. BIBLIOGRAPHIC REFERENCES: BENNETT, D.L., ARMIGER, W.H., AND J.N. JONES, JR. (1976) REVEGETATION AND USE OF EASTERN SURFACE MINE SPOILS. IN: LAND APPLICATION OF WASTE MATERIALS, SCSA, PP. 195-215.

****PROJECT: 00387-OPERATE OHMSETT**

STARTING/ COMPLETION DATE : 05/74 - 10/77 : FUNDING : ESTIMATED - FY77 / \$ 40000
 TASK CODE=B623C-235 **EPA=68-03-0490 ** (CNTR.) PRIOR FY76 / \$ 611000

EPA OFFICER.: JS FARLOW EPA/IERL - CINC
 INVESTIGATOR.: R ACKERMAN M & H SILAS MASON CO INC
 E MCCracken M & H SILAS MASON CO INC

MILESTONES...: 10/75 -FUNDING PACKAGE SUBMITTED
 11/75 -AWARD FUNDS FOR PROJECT
 10/77 -COMPLETION DATE

PLAN ID..... (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES... REC-000387 SSIE-GMA 3664 EPA -68-03-0490 TASK-B623C-235
 AP -623C DU -N105 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THIS PROJECT IS TO PROVIDE AN OPERATIONS AND MAINTENANCE STAFF AND A MECHANISM FOR OPERATING THE OHMSETT FACILITY. THE CONTRACTOR PROVIDES A PERMANENT STAFF OF A MANAGER, A SECRETARY, AN ENGINEER, A CHEMIST, AN ACCOUNTANT/EXPEDITER AND FIVE TECHNICIANS. AUTHORITY IS PROVIDED IN THE CONTRACT FOR THE LOCAL HIRING OF TEMPORARY PERSONNEL AND THE EXECUTION OF SMALL SUBCONTRACTS AS NEEDED TO OPERATE AND MAINTAIN THE FACILITY. FUNDING FOR THIS "OPERATE OHMSETT" PROJECT IS PROVIDED BY VARIOUS TESTING PROGRAMS EXECUTED FOR OHMSETT "CUSTOMERS". EACH TESTING PROGRAM IS DESIGNATED JOB ORDER 1, 2 ETC., AND IS PERFORMED ON A TIME-AND-MATERIALS BASIS. FACILITY CUSTOMERS ARE AT PRESENT LIMITED TO FEDERAL, STATE AND LOCAL GOVERNMENT AGENCIES. PRIMARY CUSTOMERS ARE THE U.S. COAST GUARD, THE U.S. NAVY, U.S. EPA OIL SPILL RELATED PROJECTS, AND THE U.S. EPA HAZARDOUS MATERIAL SPILL RELATED PROJECTS. EACH CUSTOMER-RELATED JOB ORDER CONSTITUTES AN EPA PROJECT FUNDED BY EPA OR AN IAG WITH ANOTHER AGENCY. IN EACH CASE, A CUSTOMER-RELATED JOB ORDER REPRESENTS INCREMENTAL FUNDING TO THE "OPERATE OHMSETT" PROJECT. IN SOME CASES, THE JOB ORDERS THEMSELVES ARE INCREMENTALLY FUNDED, SINCE IT IS NOT ALWAYS POSSIBLE TO ACCURATELY ESTIMATE THE ACTUAL COST TO COMPLETE A JOB ORDER PRIOR TO ITS EXECUTION. THE PROJECT PROVIDES OTHER FEDERAL AGENCIES WITH A FACILITY TO ACCOMPLISH THEIR SIMILAR PROJECTS, AT NO EXPENSE TO EPA.

****PROJECT: 00388-OHMSETT SUPPORT - NAVAL WEAPONS STATION EARLE**

STARTING/ COMPLETION DATE : 06/74 - 12/82 : FUNDING : ESTIMATED - FY77 / \$ 38000
 TASK CODE=B623C-236 **EPA=D4-F491 ** (IAG) PRIOR FY76 / \$ 20000

EPA OFFICER.: JS FARLOW EPA/IERL - CINC
 INVESTIGATOR.: D BRUNDAGE US DOD

MILESTONES...: 05/74 -FUNDING PACKAGE SUBMITTED
 06/74 -AWARD FUNDS FOR PROJECT
 10/76 -FUNDING INCREMENT
 10/77 -FUNDING INCREMENT
 10/78 -FUNDING INCREMENT
 10/79 -FUNDING INCREMENT
 10/80 -FUNDING INCREMENT
 10/81 -FUNDING INCREMENT
 12/82 -FINAL REPORT RECIEVED

PLAN ID..... (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES... REC-000388 SSIE-GMA 4402 EPA -D4-F491 TASK-B623C-236
 AP -623C DU -N105 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THIS INTERAGENCY AGREEMENT IS TO PROVIDE OHMSETT WITH CERTAIN SPECIFIC SUPPORT SERVICES WHICH ARE REQUIRED FOR OHMSETT OPERATIONS, AND WHICH EITHER CANNOT BE OBTAINED ELSEWHERE, OR CAN BE OBTAINED THROUGH THE NAVY AT THE LEAST COST. THE SUPPORT SERVICES ARE OBTAINED THROUGH AN INTERAGENCY AGREEMENT WITH NAVAL WEAPONS STATION EARLE FROM WHOM EPA HAS LEASED THE PROPERTY ON WHICH OHMSETT IS SITED. THIS AGREEMENT PROVIDES SECURITY SERVICES, FIRE PROTECTION, TANK FILLING AND EMPTYING SERVICES (OPERATION OF NAVY PUMPS TO PROVIDE WATER), RUBBISH REMOVAL, RENTAL OF A FORKLIFT AND CRANES AS NEEDED AND OTHER SIMILAR SERVICES.

****PROJECT: 00390-PERFORMANCE TESTING OFFSHORE EQUIPMENT**

STARTING/ COMPLETION DATE : 04/76 - 12/80 : FUNDING : ESTIMATED - FY77 / \$ 175000
 TASK CODE=B623C-246 **EPA=68-03-0490 ** (CNTR.) PRIOR FY76 / \$ 35000

EPA OFFICER.: JS FARLOW EPA/IERL - CINC
 INVESTIGATOR.: R ACKERMAN M & H SILAS MASON CO INC
 MILESTONES...: 03/76 -FUNDING PACKAGE SUBMITTED
 04/76 -AWARD FUNDS FOR PROJECT
 12/80 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES...: RECN-000390 SSIE-GMA 3665 EPA -68-03-0490 TASK-B623C-246
 AP -623C DU -N105 LABT-EMI

ABSTRACT.....: EVALUATE PERFORMANCE OF SELECTED SPILL CLEANUP EQUIPMENT. CONDUCT CONTROLLED REPRODUCIBLE TESTS IN
 EPA'S OHMSETT TEST FACILITY. EQUIPMENT EVALUATED INCLUDES TWO OIL SKIMMERS (MACRO CLASS V AND A
 PROTOTYPE OIL MOP, INC. ZRV) AND A RESEARCH PROTOTYPE SORBENT SYSTEM (CEL). FINAL REPORTS ARE BEING
 PREPARED.

****PROJECT: 00391-OIL SPILL AND OIL POLLUTION REPORTS II**

STARTING/ COMPLETION DATE : 02/77 - 03/79 : FUNDING : ESTIMATED - FY77 / \$ 49000
 TASK CODE=B623C-266 **EPA=R805052-01 ** (GRANT) PRIOR FY76 / \$ 44000

EPA OFFICER.: LT MCCARTHY EPA/IERL - CINC
 INVESTIGATOR.: HW OFFEN UNIV OF CALIFORNIA SANTA BARBARA CAMPUS
 MILESTONES...: 12/76 -FUNDING PACKAGE SUBMITTED
 02/77 -AWARD FUNDS FOR PROJECT
 03/79 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES...: RECN-000391 SSIE-GMA 3615 EPA -R805052-01 TASK-B623C-266
 AP -623C DU -N105 LABT-EMI

ABSTRACT.....: THE PURPOSE OF THIS PROJECT IS TO PREPARE A QUARTERLY PUBLICATION SERVING AS A SINGLE INFORMATION
 SOURCE FOR: CURRENT OIL SPILL EVENTS, SCIENTIFIC AND TECHNICAL PUBLICATIONS RELATING TO OIL
 POLLUTION RESEARCH, OIL POLLUTION STUDIES SPONSORED BY GOVERNMENT, INDUSTRY AND PRIVATE AND PUBLIC
 INSTITUTIONS AND OIL POLLUTION RELATED "PATENT" DESCRIPTION

****PROJECT: 00392-REVIEW AND ANALYSIS OF OIL/WATER SEPARATION LITERATURE**

STARTING/ COMPLETION DATE : 06/75 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 10000
 TASK CODE=B623C-271 **EPA=R803978-01 ** (GRANT) PRIOR FY76 / \$ 10000

EPA OFFICER.: LT MCCARTHY EPA/IERL - CINC
 INVESTIGATOR.: RC AHLERT RUTGERS STATE UNIV OF NJ SCH OF EN/CHEM & BIOCHEM ENG
 MILESTONES...: 05/75 -FUNDING PACKAGE SUBMITTED
 06/75 -AWARD FUNDS FOR PROJECT
 07/76 -GRANT AMENDMENT
 12/76 -GRANT AMENDMENT
 04/77 -GRANT AMENDMENT
 03/78 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES...: RECN-000392 SSIE-GMA 3750 EPA -R803978-01 TASK-B623C-271
 AP -623C DU -N105 LABT-EMI

ABSTRACT.....: THE PROJECT WILL IDENTIFY, ORGANIZE AND INTERPRET TECHNICAL AND COMMERCIAL LITERATURE RESOURCES ON
 OIL/WATER SEPARATION. DETAILED INFORMATION ON DESIGN CONSIDERATION AND OPERATING CHARACTERISTICS OF
 SYSTEMS, DEVICES AND PROCESSES, WILL BE ASSEMBLED.

****PROJECT: 00393-MOP OIL SPILL DISPERSANTS**

STARTING/ COMPLETION DATE : 09/77 - 09/79 : FUNDING : ESTIMATED - FY77 / \$ 21000
 TASK CODE=B623C-272 **EPA=68-03-2621 ** (CNTR.) PRIOR FY76 / \$ 30000

EPA OFFICER.: LT MCCARTHY EPA/IERL - CINC
 INVESTIGATOR.: UNKNOWN WOODWARD & CLYDE CNSLTS
 MILESTONES.: 03/76 -FUNDING PACKAGE SUBMITTED
 08/77 -FUNDING INCREMENT
 09/77 -AWARD FUNDS FOR PROJECT
 09/79 -FINAL REPORT RECEIVED

PLAN ID.: (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES.: RECN-000393 SSIE-GMA 4634 EPA -68-03-2621 TASK-B623C-272
 AP -623C DU -N105 LABT-EMI

ABSTRACT.: THE OBJECTIVE IS TO DEVELOP A FIRST GENERATION MANUAL OF PRACTICE FOR ENVIRONMENTALLY ACCEPTABLE UTILIZATION OF OIL SPILL DISPERSANTS TO "PREVENT OR SUBSTANTIALLY REDUCE EXPLOSION OR FIRE HAZARD TO PROPERTY", OR "PREVENT OR REDUCE SUBSTANTIAL HAZARD TO A MAJOR SEGMENT OF THE POPULATIONS OR VULNERABLE SPECIES OF WATERFOWL", OR "RESULT IN LEAST OVERALL ENVIRONMENTAL DAMAGE, OR INTERFERENCE WITH DESIGNATED WATER USE". THE APPROACH UTILIZED WILL BE THE REDUCTION OF THE SCIENTIFIC AND TECHNICAL LITERATURE CURRENTLY EXISTING INTO A PRACTICAL, UTILITARIAN FORMAT WHICH ESTABLISHES GUIDELINES AND CRITERIA TO IMPLEMENT BOTH THE "SPIRIT AND LETTER" OF ANNEX X (SCHEDULE OF CHEMICALS AND OTHER ADDITIVES TO REMOVE OIL AND HAZARDOUS SUBSTANCES DISCHARGE) OF THE NATIONAL OIL AND HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY PLAN (CFR, VOL. 40, NO. 28, FEBRUARY 10, 1975). ADDITIONALLY, AN INVENTORY OF AVAILABLE EQUIPMENT AND AGENT APPLICATION AND USE EXPERTS WILL BE DEVELOPED. NUMEROUS STUDIES HAVE DOCUMENTED THE ADVERSE TOXICOLOGICAL PROPERTIES OF DISPERSANTS AND OIL ALONE, AND IN COMBINATION. AS A RESULT DISPERSANTS ARE NOT UTILIZED IN PRACTICE AS AN EFFECTIVE OIL SPILL CONTROL AND COUNTERMEASURE OPTION. PRODUCTS, TECHNIQUES AND EQUIPMENT FOR FIELD USE ARE AVAILABLE. WHAT IS NEEDED IS GUIDELINES FOR THEIR USE IN AN ENVIRONMENTALLY ACCEPTABLE MANNER. THE DECISION MAKING PROCESS TO USE OR NOT TO USE DISPERSANTS IS COMPLEX AND INVOLVES PRACTICAL COMPROMISE OR TRADE-OFFS BETWEEN THE SEVERAL AVAILABLE OPTIONS FOR CLEANUP AND CONTROL. HOWEVER DISPERSANTS DO HAVE THEIR PLACE IN THE ARSENAL OF SPILL CONTROL OPTIONS. THE PROPER USE OF DISPERSANTS AT THE RIGHT TIME AND PLACE COULD SIGNIFICANTLY MITIGATE THE ADVERSE ENVIRONMENTAL EFFECTS OF OIL SPILLS. THIS PROJECT WILL IDENTIFY THE PROPER USE OF DISPERSANTS, AS WELL AS FIELD METHODS, EQUIPMENT, TECHNIQUES AND APPLICATION EXPERTS FOR THEIR USE IN AN ENVIRONMENTALLY ACCEPTABLE MANNER. ADDITIONALLY, DISPERSANT PRODUCT TESTING WILL BE PERFORMED IN ORDER

****PROJECT: 00395-METHODS MANUAL FOR OIL SPILL SOURCE IDENTIFICATION**

STARTING/ COMPLETION DATE : 01/76 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 18000
 TASK CODE=B623C-275 **EPA= ** (IN-HO) PRIOR FY76 / \$ 10000

IN-HOUSE EFFORT : FY 77 / 00.6 YEARS : TOTAL PROJECT 01.8

EPA OFFICER.: M GRUENFELD EPA/IERL - CINC
 INVESTIGATOR.: M GRUENFELD US EPA
 MILESTONES.: 01/76 -INITIATE PROJECT
 04/76 -COMPLETE LITERATURE REVIEW
 09/77 -COMPLETE METHODS EVALUATION
 12/77 -DRAFT MANUAL
 03/78 -FINAL MANUAL

PLAN ID.: (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES.: RECN-000395 SSIE-ZMA 1335 TASK-B623C-275 AP -623C
 DU -N105 LABT-EMI

ABSTRACT.: THE OBJECTIVE OF THIS PROJECT IS TO DEVELOP A COMPREHENSIVE MANUAL OF PROVEN ANALYTICAL METHODS FOR THE QUANTITATION, CHARACTERIZATION, AND SOURCE IDENTIFICATION OF PETROLEUM OILS THAT ARE SPILLED INTO THE ENVIRONMENT. A MANUAL OF RELIABLE ANALYTICAL METHODS WILL BE PREPARED IN ORDER TO MONITOR OIL POLLUTION IN THE VICINITY OF OIL SPILLS, OIL PRODUCTION PLATFORMS, TANKER ROUTES, INDUSTRIAL AND MUNICIPAL OUTFALLS, ET AL. ALTHOUGH METHODS FOR ANALYZING OILS IN WATER, SEDIMENTS, AND BIOLOGICAL TISSUES ARE CURRENTLY PROLIFERATING, THEY GENERALLY LACK SENSITIVITY, SPECIFICITY AND ADEQUATE VALIDATION. THIS PROJECT WILL REVIEW THE AVAILABLE METHODS, AND CONSOLIDATE THE MOST APPROPRIATE ONES WITHIN THE CONTEXT OF A STATE-OF-THE-ART EPA OIL SPILL METHODS MANUAL.

****PROJECT: 00396-METHOD OF QUANTITATION FOR PETROLEUM OILS IN WATER**

STARTING/ COMPLETION DATE : 06/75 - 06/79 : FUNDING : ESTIMATED - FY77 / \$ 21000
 TASK CODE=B623C-276 **EPA= ** (IN-HO) PRIOR FY76 / \$ 15000

IN-HOUSE EFFORT : FY 77 / 00.7 YEARS : TOTAL PROJECT 02.0

EPA OFFICER.: M GRUENFELD EPA/IERL - CINC
 INVESTIGATOR.: M GRUENFELD US EPA
 MILESTONES.: 06/75 -INITIATE PROJECT
 09/75 -REPORT TEST RESULTS OF ADSORPTION PROCEDURES
 12/76 -REPORT ON UTILITY OF IR
 12/77 -REPORT ON UTILITY OF GC
 12/78 -REPORT ON UTILITY OF FLUORESCENCE SPECTROSCOPY
 06/79 -FINAL REPORT

PLAN ID.: (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES.: RECN-000396 SSIE-ZMA 1336 TASK-B623C-276 AP -623C
 DU -N105 LABT-EMI

ABSTRACT.: THE OBJECTIVE OF THIS PROJECT IS TO DEVELOP A METHOD FOR QUANTITATING PETROLEUM OILS THAT ARE DISPERSED IN WATER, OR THAT HAVE SEPARATED FROM WATER DISPERSION FOLLOWING SAMPLE COLLECTION. THE METHOD WILL BE SPECIFIC FOR PETROLEUM OILS, I.E., IT SHOULD ACCURATELY QUANTITATE PETROLEUM EVEN IN THE PRESENCE OF NON-PETROLEUM ORGANICS. APPLICATION TO THE MINIMUM CONCENTRATION 1 MICROGRAM PER LITER (PPB) IS DESIRED. THE METHODOLOGY TO BE USED WILL INCLUDE PROCEDURES SUCH AS SOLVENT EXTRACTION, ADSORPTION, GAS AND LIQUID CHROMATOGRAPHY, SPECTROSCOPY, ET AL.

****PROJECT: 00399-PROTECTION AND RESTORATION OF SHORELINES FROM OIL SPILLS**

STARTING/ COMPLETION DATE : 12/74 - 03/77 : FUNDING : ESTIMATED - FY77 / \$ 12000
 TASK CODE=B623C-287 **EPA=68-03-2160 ** (CNTR.) PRIOR FY76 / \$ 158000

EPA OFFICER.: L MCCARTHY EPA/IERL - CINC
 INVESTIGATOR.: R CASTLE U R S RES CO
 MILESTONES....: 11/74 -FUNDING PACKAGE SUBMITTED
 12/74 -AWARD FUNDS FOR PROJECT
 03/74 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES...: RECN-000399 SSIE-GMA 3686 EPA -68-03-2160 TASK-B623C-287
 AP -623C DU -N105 LABT-EMI

ABSTRACT.....: THE OBJECTIVES OF THIS PROJECT ARE TO PROVIDE FROM EFFICIENT ACTION TO MINIMIZE DAMAGE TO SHORELINES FROM OIL AND HAZARDOUS SUBSTANCE DISCHARGES INCLUDING CONTAINMENT, DISPERSAL AND REMOVAL. EPA HEADQUARTERS HAS SPECIFICALLY EXPRESSED THE NEED FOR, AND GIVEN THE HIGHEST PRIORITY TO, MANUALS OF PRACTICE (MOP) TO MEET THE OPERATIONAL NEEDS OF FIELD PERSONNEL DURING SPILL RESPONSE ACTIONS TO PROTECT AND RESTORE THREATENED AND CONTAMINATED SHORE AREAS. THE PROJECTS ASSOCIATED WITH THE MILESTONE WILL SATISFY THE NEED BY SUPPLYING MANUALS OF PRACTICE WHICH WILL BE UTILIZED BY ON-THE-SCENE FIELD PERSONNEL. FOR THE ACCOMPLISHMENT OF THIS MILESTONE, THE APPROACH OR METHODOLOGY IS TO EVALUATE AND SELECT FROM THE CURRENTLY PRACTICED STATE-OF-THE-ART, THOSE FIELD RELEVANT METHODS AND TECHNIQUES FOR REDUCTION TO CONCISE DESCRIPTIVE HANDBOOK FORMAT FOR ON-THE-SCENE USE BY FIELD PERSONNEL. THE MANUALS WILL EMPHASIZE THE DECISION PROCESS THROUGH WHICH THE FIELD PERSONNEL MUST PROGRESS IN ORDER TO ARRIVE AT THE PROPER RECOMMENDATION. FOR EXAMPLE, IN PROTECTING A MARSH AREA, SOME QUESTIONS THAT SHOULD BE ANSWERED MAY INCLUDE THE TYPE OF MARSH GRASSES, THE INHABITANTS OF THE MARSH, THE TIME OF YEAR, EXPECTED WEATHER CONDITIONS AND THE ECOLOGICAL, RECREATIONAL, COMMERCIAL AND AESTHETIC VALUE OF THE MARSH. FIELD PROCEDURES WILL BE APPENDED FOR UTILIZING EXISTING PRODUCTS, EQUIPMENT AND SUPPLIES. THESE PROCEDURES WILL OUTLINE IN CONCISE DESCRIPTIVE FORMAT THE STEP-BY-STEP APPROACH FOR IMPLEMENTATION BY THE ON-THE-SCENE FIELD PERSONNEL.

****PROJECT: 00400-PETROLEUM PIPELINE LEAK DETECTION**

STARTING/ COMPLETION DATE : 04/77 - 04/79 : FUNDING : ESTIMATED - FY77 / \$ 110000
 TASK CODE=B623C-298 **EPA=68-03-2532 ** (CNTR.) PRIOR FY76 / \$ 80000

EPA OFFICER.: JS DORRER EPA/IERL - CINC
 INVESTIGATOR.: GH BURGHART SCI APPLICATIONS INC
 MILESTONES....: 02/76 -FUNDING PACKAGE SUBMITTED
 04/77 -AWARD FUNDS FOR PROJECT
 04/77 -FUNDING INCREMENT
 02/78 -FUNDING INCREMENT
 04/79 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES...: RECN-000400 SSIE-GMA 3668 EPA -68-03-2532 TASK-B623C-298
 AP -623C DU -N105 LABT-EMI

ABSTRACT.....: THIS PROJECT IS INTENDED TO DEFINE THE STATE-OF-THE-ART OF PIPELINE LEAK DETECTION AND TO DEVELOP AN IMPROVED TECHNIQUE OR SET OF TECHNIQUES TO ADVANCE THIS AREA OF TECHNOLOGY. AT PRESENT, A LARGE PERCENTAGE OF INLAND OIL SPILLS ARE DUE TO PIPELINE FAILURES OF VARIOUS TYPES. ADDITIONALLY, WITH NEW PORTIONS OF THE OUTER CONTINENTAL SHELF BEING DEVELOPED FOR OIL AND GAS RESOURCES, PIPELINES WILL BE THE PRINCIPAL MEANS OF MOVING THE PRODUCTS TO SHORE, AND THROUGH VARIOUS ONSHORE FACILITIES. THE PRESENT STATE-OF-THE-ART OF PIPELINE LEAK DETECTION PERMITS SIZEABLE QUANTITIES OF MATERIAL TO FLOW FROM THE PIPE PRIOR TO SHUTDOWN. THEREFORE, IT IS NECESSARY TO ATTEMPT TO ADVANCE THE STATE-OF-THE-ART OF LEAK DETECTION TO MINIMIZE ENVIRONMENTAL IMPACTS OF LEAKING PIPELINES.

****PROJECT: 00401-ENVIRONMENTAL GUIDELINES FOR ONSHORE IMPACT OF OFFSHORE PETROLEUM DEVELOPMENT**

STARTING/ COMPLETION DATE : 03/76 - 03/79 : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=B623C-300 **EPA=D6-0008 ** (IAG) PRIOR FY76 / \$ 100000

EPA OFFICER.: JS FARLOW EPA/IERL - CINC
 INVESTIGATOR.: WW DOYEL US DOI RES & LAND INVEST PROG
 PA MARCUS US DOI RES & LAND INVEST PROG
 MILESTONES....: 02/76 -FUNDING PACKAGE SUBMITTED
 03/76 -AWARD FUNDS FOR PROJECT
 07/76 -FUNDING INCREMENT
 03/77 -FUNDING INCREMENT
 03/79 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES...: RECN-000401 SSIE-GMA 3781 EPA -D6-0008 TASK-B623C-300
 AP -623C DU -N105 LABT-EMI

ABSTRACT.....: OBJECTIVE: TO CARRY OUT A SERIES OF WORKSHOPS FOR STATE AND LOCAL PLANNING OFFICIALS TO PROVIDE THEM WITH METHODOLOGIES AND INFORMATION PERTAINING TO THE IDENTIFICATION OF THE ONSHORE IMPACT OF OUTER CONTINENTAL SHELF PETROLEUM DEVELOPMENT AND THE SITING OF FACILITIES ASSOCIATED WITH THAT DEVELOPMENT. APPROACH: RETAIN THE AMERICAN SOCIETY OF PLANNING OFFICIALS (ASPO) TO SET UP THE MEETINGS, ARRANGE FOR CURRICULA AND FACILITY, PREPARE PREPRINTS AND PROCEEDINGS, AND PRESENT A FINAL REPORT BOTH ON THE CONTENT AND ON THE SUCCESS OF THIS MEANS OF RAPID DISSEMINATION OF INFORMATION. USE THE RESULTS OF USGC-FUNDED NEW ENGLAND RIVER BASINS COMMISSION (NERBC) METHODOLOGY AND DEVELOPMENT FOR THE NEW ENGLAND OCS FRONTIER AS A BASIS FOR THE FIRST SERIES OF WORKSHOPS (HELD IN 5 LOCATIONS AROUND THE COASTAL U.S.). INVOLVE STATE AND LOCAL PLANNERS FROM THE REGION WHERE EACH WORKSHOP IS HELD TO THE MAXIMUM EXTENT POSSIBLE IN PREPARATION AND IN EXECUTION TO ENRICH THE TOTAL CONTENT, TO ENSURE USEFUL FEEDBACK TO NERBC, AND TO GUARANTEE A NATIONALLY USEFUL BODY OF INFORMATION AND METHODS. PROGRESS: IAG WITH USGS SIGNED; ASPO CONTRACT SIGNED; FEDERAL AND REGIONAL ADVISORY COMMITTEES BEING FORMED; FIRST WORKSHOPS TENTATIVELY SCHEDULED FOR JANUARY 1977.

****PROJECT: 00421-NEW AMINE CARBAMATE GELATION TECHNIQUES FOR USE IN OIL SPILL RECOVERY**

OPERATIONS
 STARTING/ COMPLETION DATE : 05/77 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 29000
 TASK CODE=B623C-602 **EPA=R804628-01 ** (GRANT) PRIOR FY76 /

EPA OFFICER.: U FRANK EPA/IERL - CINC
 INVESTIGATOR.: WW BANNISTER UNIV OF LOWELL SCH OF PURE & APPLIED SCI
 A DONATELLI UNIV OF LOWELL SCH OF PURE & APPLIED SCI
 J WALKINSHAW UNIV OF LOWELL SCH OF PURE & APPLIED SCI

MILESTONES...: 03/77 -FUNDING PACKAGE SUBMITTED
 05/77 -AWARD FUNDS FOR PROJECT
 03/78 -DRAFT FINAL REPORT
 05/78 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES...: REC-N-000421 SSIE-GMA 3739 EPA -R804628-01 TASK-B623C-602
 AP -623C DU -N105 LABT-EMI

ABSTRACT.....: THE MAIN OBJECTIVE OF THIS RESEARCH IS TO DEVELOP FOR "REAL WORLD" SITUATIONS AND AMINE CARBAMATE GELATION TECHNIQUE TO FACILITATE THE REMOVAL OF PETROLEUM DERIVED OIL SPILLED ON OCEAN OR INLAND WATERS. THE SPECIFIC OBJECTIVES ARE: A. DETERMINATION OF PHYSICAL PROPERTIES OF A SELECTED GELLING AGENT (DEHYDROABIETYL AMINE), INCLUDING SOLUBILITY AND DETERGENCY DETERMINATIONS OF THE AGENT IN WATER/OIL MATRICES. B. DEVELOPMENT OF CARBAMATING AGENTS OTHER THAN CARBON DIOXIDE. C. DETERMINE THE FEASIBILITY OF OIL AND AGENT RECOVERY BY CENTRIFUGATION. D. PILOT STUDIES OF GELATION TECHNIQUE IN LARGE LABORATORY WAVE TANKS. E. FIELD TESTS OF GELATION TECHNIQUE AT EPA TEST FACILITIES. F. PRELIMINARY EVALUATION OF AGENT FOR GELLING NON PETROLEUM HAZARDOUS MATERIALS. G. PRELIMINARY EVALUATION OF THE GELATION TECHNIQUE'S UTILITY IN THE PROPHYLACTIC TREATMENT OF BEACH FRONTS.

****PROJECT: 00423-MULTIAGENCY PROJECT FOR OIL SPILL EQUIPMENT EVALUATION, PHASE I**

STARTING/ COMPLETION DATE : 06/77 - 10/77 : FUNDING : ESTIMATED - FY77 / \$ 38000
 TASK CODE=B623C-612 **EPA=68-03-0490 ** (CNTR.) PRIOR FY76 /

EPA OFFICER.: JS FARLOW EPA/IERL - CINC
 INVESTIGATOR.: R ACKERMAN M & H SILAS MASON CO INC

MILESTONES...: 06/77 -FUNDING PACKAGE SUBMITTED
 06/77 -AWARD FUNDS FOR PROJECT
 10/77 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES...: REC-N-000423 SSIE-GMA 3666 EPA -68-03-0490 TASK-B623C-612
 AP -623C DU -N105 LABT-EMI

ABSTRACT.....: PERFORMANCE EVALUATION OF COMMERCIALLY AVAILABLE SPILL CLEANUP EQUIPMENT. PERFORMANCE TESTING OF ACTUAL EQUIPMENT AT OHMSETT. FOUR OIL SKIMMERS HAVE BEEN SELECTED AND THEIR THROUGHPUT EFFICIENCY, OIL RECOVERY EFFICIENCY AND OIL RECOVERY RATE WILL BE DETERMINED FOR TWO OIL TYPES UNDER A VARIETY OF CURRENT AND WAVE CONDITIONS. A FINAL REPORT WILL BE PREPARED.

****PROJECT: 00424-OPTIMIZATION OF LAND CULTIVATION PARAMETERS**

STARTING/ COMPLETION DATE : 08/77 - 06/78 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=B623C-621 **EPA=R805474 ** (GRANT) PRIOR FY76 /

EPA OFFICER.: JS FARLOW EPA/IERL - CINC
 INVESTIGATOR.: K BROWN TEXAS A & M UNIV SCH OF AGRIC

MILESTONES...: 07/77 -FUNDING PACKAGE SUBMITTED
 08/77 -AWARD FUNDS FOR PROJECT
 06/78 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-623C)(DU-N105) ENERGY RESOURCE EXTRACTION AND HANDLING, OIL & GAS PROD.
 ORDIS CODES...: REC-N-000424 SSIE-GMA 3713 EPA -R805474 TASK-B623C-621
 AP -623C DU -N105 LABT-EMI

ABSTRACT.....: RESEARCH IS TO BE CONDUCTED ON THE LAND DISPOSAL OF TANK BOTTOM AND API SEPARATOR WASTES. THE INVESTIGATION WILL UTILIZE THREE DIVERSE WASTES, AND TESTS WILL BE CONDUCTED ON SEVERAL SOILS REPRESENTING A RANGE OF CHARACTERISTICS. THE INVESTIGATION WILL BEGIN WITH CHARACTERIZATION OF THE WASTES. THIS DATA WILL BE USED TO DECIDE ON THE APPLICATION RATES TO BE USED IN THE STUDIES. MEASUREMENTS WILL BE MADE OF THE DECOMPOSITION RATE OF THE WASTES, THE INFLUENCE OF APPLICATIONS ON PLANT SURVIVAL AND GROWTH, AND THE CONCENTRATIONS OF POTENTIAL POLLUTANTS IN RUNOFF AND LEACHATE WATER. THE FATE AND MOBILITY OF THE WASTES IN THE SOIL WILL BE INVESTIGATED IN THE LABORATORY, IN GREENHOUSE TESTS, AND ULTIMATELY, IN FIELD TESTS. THE RESEARCH SHOULD PROVIDE INSIGHT INTO THE FEASIBILITY OF LAND DISPOSAL OF THIS CLASS OF WASTE, AND THE RESULTS WILL BE USED TO DEVELOP CRITERIA TO BE USED IN THE DESIGN, MANAGEMENT, AND MONITORING OF OILY WASTE DISPOSAL OPERATIONS.

Environmental Impact of Conventional and Advanced Energy Systems

****PROJECT: 00431-UNIVERSITY OF ILLINOIS CORE TEAM PARTICIPATION IN OHIO RIVER BASIN ENERGY STUDY, PHASE II**

STARTING/ COMPLETION DATE : 11/77 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 125000
 TASK CODE=B624 -06 **EPA=R805587-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: L SMITH EPA/IERL - CINC
 INVESTIGATOR.: JJ STUKEL UNIV OF ILLINOIS SCH OF ENG/CIV ENG DEPT
 BR KEENAN UNIVERSITY OF ILLINOIS
 GL FOWLER UNIVERSITY OF ILLINOIS
 JP HARTNETT UNIVERSITY OF ILLINOIS
 M RIEBER UNIV OF ILLINOIS SCH OF ENG/CIV ENG DEPT

MILESTONES....: 09/77 -GRANT AWARDED
 11/77 -PROJECT INITIATION
 10/78 -PROJECT TERMINATION

PLAN ID.....: (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT
 ORDIS CODES...: RECN-000431 SSIE-GMA 4857 EPA -R805587-01 TASK-B624 -06
 AP -624 DU -L110 LABT-EMI

ABSTRACT.....: THE OHIO RIVER BASIN ENERGY STUDY (ORBES), PHASE II: AN IMPACT ASSESSMENT OF ENERGY CONVERSION FACILITIES IN THE OHIO RIVER BASIN, IS A CONTINUATION OF A COMPREHENSIVE, POLICY-ORIENTED TECHNOLOGY ASSESSMENT ADDRESSING THE BROAD-SCALE ENVIRONMENTAL, PUBLIC HEALTH, ECONOMIC, INSTITUTIONAL, AND SOCIAL EFFECTS OF LOCATING VARIOUS COMBINATIONS OF ENERGY CONVERSION AND SUPPORT FACILITIES IN THE OHIO RIVER BASIN. THE APPROACH IS THAT OF INTEGRATED TECHNOLOGY ASSESSMENT, CONDUCTED BY AN INTERDISCIPLINARY, INTERINSTITUTIONAL (EIGHT STATE UNIVERSITIES IN THE SIX STUDY REGION STATES OF ILLINOIS, INDIANA, KENTUCKY, OHIO, PENNSYLVANIA, AND WEST VIRGINIA) TEAM, WITH SUPPORT RESEARCH PERFORMED BY OTHER PERSONNEL ON A SCHEDULE TO BEST FIT THE RESEARCH NEEDS OF THE TECHNOLOGY ASSESSMENT TEAM. PHASE I OF THE STUDY, CONDUCTED IN 1976-77, WAS A PRELIMINARY, "FIRST-CUT" IMPACT ASSESSMENT. MOST IMPACTS IDENTIFIED WERE FIRST-ORDER. IN PHASE II, DATA AND ASSESSMENTS MADE IN THE FIRST YEAR WILL BE DRAWN UPON, AND INADEQUACIES IDENTIFIED WILL BE CORRECTED.

****PROJECT: 02942-ADVANCED WASTE HEAT CONTROL-WASTE UTILIZATION PROGRAM**

STARTING/ COMPLETION DATE : 10/75 - 10/76 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=J624 -64 **EPA=68-03-2591 ** (CNTR.) PRIOR FY76 / \$ 110000

EPA OFFICER.: VW LAMBOU EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: RW THOMAS NORTHROP CORP NORTHROP SERVS
 RW THOMAS US EPA
 VW LAMBOU US EPA

MILESTONES....: 09/77 -DEFINITION OF FOLLOWING CORRECTIVE ACTIONS
 12/77 -PUBLICATION OF REPORT: HAZARDOUS CHEMICALS IN COOLING SYSTEM EFFL
 12/77-PUBLICATION OF REPORT: DETECTION AND MONITORING OF HAZARDOUS CHE

PLAN ID.....: (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT
 ORDIS CODES...: RECN-002942 SSIE-GMA 4069 EPA -68-03-2591 TASK-J624 -64
 AP -624 DU -L110 LABT-MTS

ABSTRACT.....: OBJECTIVES: THE OBJECTIVES OF THIS STUDY ARE TO INVENTORY HAZARDOUS MATERIALS TO BE FOUND IN ENERGY-RELATED COOLING SYSTEM EFFLUENTS, EVALUATE THE PRESENT STATE-OF-THE-ART OF TECHNOLOGY FOR MONITORING THESE MATERIALS, AND TO INITIATE CORRECTIVE ACTIONS WHERE DEFICIENCIES IN THE TECHNOLOGY ARE IDENTIFIED. APPROACH: THIS WILL BE ACCOMPLISHED THROUGH EXTENSIVE LITERATURE REVIEW, PERSONAL CONTACTS WITH COOLING TOWER OPERATORS, MONITORING EQUIPMENT MANUFACTURERS, AND OTHER PROFESSIONAL PERSONNEL. DATA OBTAINED WILL BE PRESENTED IN TWO REPORTS, ONE IDENTIFYING MATERIALS TO BE FOUND OR EXPECTED IN COOLING SYSTEM EFFLUENTS AND A SECOND EVALUATING THE PRESENT STATE-OF-THE-ART OF APPROPRIATE MONITORING TECHNOLOGY. OUTPUT: BASED ON THE RESULTS OBTAINED FROM THE ABOVE EFFORT, CORRECTIVE ACTIONS WILL BE TAKEN TO OVERCOME DEFICIENCIES IN MONITORING TECHNOLOGY. THESE WILL INVOLVE PUBLICATION OF TECHNIQUES, DEVELOPMENT AND/OR MODIFICATION OF EQUIPMENT, OR OTHER EFFORTS.

****PROJECT: 03583-CONFERENCE - INTERGOVERNMENTAL ENERGY AND ENVIRONMENTAL COOPERATION THE OHIO VALLEY**

STARTING/ COMPLETION DATE : 11/77 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 16230
 TASK CODE=M624 -001 **EPA=R805615-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: L SMITH EPA/ERL - CORVALLIS
 INVESTIGATOR.: SK GOVE UNIV OF ILLINOIS URBANA CHAMPAIGN CAMPUS
 B KEENAN UNIV OF ILLINOIS URBANA CHAMPAIGN CAMPUS

MILESTONES....: 11/77 -PROJECT INITIATION
 03/78 -PROJECT TERMINATION

PLAN ID.....: (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT
 ORDIS CODES...: RECN-003583 SSIE-GMA 4810 EPA -R805615-01 TASK-M624 -001
 AP -624 DU -L110 LABT-HEE

ABSTRACT.....: A PROPOSAL IS SUBMITTED TO HOLD A CONFERENCE IN CINCINNATI, OHIO, ON THE TOPIC: "INTERGOVERNMENTAL ENERGY AND ENVIRONMENTAL COOPERATION: THE OHIO VALLEY CHALLENGE." ABOUT 75 INDIVIDUALS FROM ALL LEVELS OF GOVERNMENT WILL BE CONVENED TO DISCUSS THE TOPIC AND TO RECOMMEND APPROACHES TO VARIOUS PROBLEMS.

****PROJECT: 04000-OHIO RIVER BASIN ENERGY STUDY**

STARTING/ COMPLETION DATE : 11/77 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 30000
 TASK CODE=V624 -01 **EPA-RB05609-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: L SMITH
 INVESTIGATOR.: JC RANDOLPH
 MILESTONES...: 10/77 -GRANT AWARDED
 11/77 -PROJECT INITIATION
 10/78 -PROJECT TERMINATION

PLAN ID.....: (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT
 ORDIS CODES...: REC-004000 SSIE-GMA 4864 EPA -RB05609-01 TASK-V624 -01
 AP -624 DU -L110 LABT-EMI

ABSTRACT.....: THIS SET OF STUDIES REPRESENTS A PORTION OF A MULTI-INSTITUTIONAL POLICY-ORIENTED TECHNOLOGY ASSESSMENT OF THE SOCIOECONOMIC AND ENVIRONMENTAL IMPACTS WHICH MIGHT RESULT FROM A PROPOSED INCREASED CONCENTRATION OF ENERGY CONVERSION FACILITIES WITHIN THE OHIO RIVER BASIN. UTILIZING THE BEST AVAILABLE DATA BASES, THESE STUDIES WILL ATTEMPT TO ADDRESS THE BROAD-SCALE ENVIRONMENTAL, INSTITUTIONAL, ECONOMIC AND SOCIAL EFFECTS OF VARIOUS FUTURE COMBINATIONS OF ENERGY CONVERSION FACILITIES (I.E., COAL-BASED PLANTS PRODUCING SYNTHETIC FUELS, AS WELL AS NUCLEAR AND COAL-FIRED ELECTRIC POWER GENERATING PLANTS) AND THEIR REQUIRED SUPPORT FACILITIES (I.E., COAL MINING, PROCESSING AND TRANSPORTATION; ASH AND SLUDGE DISPOSAL FACILITIES; NUCLEAR FUEL AND REACTOR WASTE TRANSPORTATION FACILITIES; AND ENERGY TRANSPORTATION SYSTEMS, INCLUDING ELECTRICAL POWER TRANSMISSION SYSTEMS) THAT MIGHT BE BUILT AND OPERATED IN THIS REGION IN THE FUTURE. THE PRINCIPAL OBJECTIVES OF THIS ASSESSMENT ARE (1) TO ASSIST IN OUTLINING THE FULL RANGE OF POLICY OPTIONS FOR DEALING WITH SELECTED KINDS OF DEVELOPMENT, ALTERNATIVE LEVELS OF DEVELOPMENT AND THEIR POSSIBLE UNDESIRABLE EFFECTS, AND ALTERNATIVE TECHNOLOGICAL LEVELS OF ENVIRONMENTAL CONTROLS; AND (2) TO ANALYZE THE PROBABLE IMPACTS THAT WOULD RESULT FROM IMPLEMENTING EACH OPTION IN ITS TOTAL FRAMEWORK, WITH SPECIAL EMPHASIS ON THE NATURAL ENVIRONMENT AND ITS INTERRELATIONSHIP WITH PUBLIC HEALTH AND WELFARE. THE FULL RANGE OF PRIMARY, SECONDARY, AND HIGHER-ORDER EFFECTS WILL BE CONSIDERED.

****PROJECT: 04001-OHIO RIVER BASIN ENERGY STUDY**

STARTING/ COMPLETION DATE : 11/77 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=V624 -02 **EPA-RB05608-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: L SMITH
 INVESTIGATOR.: MA SHAPIRO
 JB ANDELMAN
 AA SODKY
 JL SYKORA

MILESTONES...: 09/77 -GRANT AWARDED
 11/77 -PROJECT INITIATION
 10/78 -PROJECT TERMINATION

PLAN ID.....: (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT
 ORDIS CODES...: REC-004001 SSIE-GMA 4856 EPA -RB05608-01 TASK-V624 -02
 AP -624 DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROPOSAL IS TO DEVELOP AN INFORMATION AND DATA BASE FOR THE DETAILED CONSIDERATION OF POTENTIAL IMPACTS OF FUTURE ENERGY REQUIREMENTS AND CONVERSION ACTIVITIES IN THE OHIO RIVER BASIN. PHASE I INCLUDES: DEMOGRAPHY, ENERGY USE BY SOURCE AND BY SECTOR; ELECTRICITY EXPORTED AND IMPORTED; ENERGY RESERVES, ELECTRICAL GENERATION CAPABILITY BY FACILITY AND FUEL TYPE; PLANT OWNERSHIP; AND SOCIAL AND ECONOMIC DATA ON REGION RESIDENTS. IN PHASE II THE BASE LINE DATA WILL BE COMPLETED BY ADDITIONAL INFORMATION ON MIGRATION, LAND USE PROJECTION, INDUCED INDUSTRY, PUBLIC HEALTH, WATER AND AIR QUALITY, COAL MINING, SOCIAL SERVICES, RECREATIONAL FACILITIES AND ECONOMICS. THE APPROACH WILL INCLUDE: 1. COLLECTION OF AVAILABLE BASE LINE DATA; 2. EXTENSIVE LITERATURE SEARCH; 3. DATA AND INFORMATION ANALYSIS; 4. PARTICIPATION IN CORE TEAM AND PUBLIC MEETINGS. THE RESULTS WILL BE COMPILED INTO COMPLETE AND COMPREHENSIVE DOCUMENTS. CURRENT PLANS INCLUDE COLLECTION AND EVALUATION OF BASE LINE DATA IDENTICAL TO THOSE ALREADY OBTAINED FOR ILLINOIS, INDIANA, KENTUCKY AND OHIO AND PARALLEL THOSE TO BE OBTAINED BY ALL STATES INVOLVED. THIS INCLUDES ALSO PARTICIPATION ON DEVELOPMENT OF PHASE II WORK PLAN, ENERGY CONVERSION CONFIGURATIONS, IMPACT ASSESSMENT AND DEFINITION OF POLICY OPTIONS.

****PROJECT: 04002-OHIO RIVER BASIN ENERGY STUDY PROJECT, PHASE II, UNIVERSITY OF KENTUCKY**

STARTING/ COMPLETION DATE : 11/77 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 55000
 TASK CODE=V624 -03 **EPA-RB05590-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: L SMITH
 INVESTIGATOR.: S JOHNSON
 DA BLOME
 E WEIL

MILESTONES...: 09/77 -GRANT AWARDED
 11/77 -PROJECT INITIATION
 10/78 -PROJECT TERMINATION

PLAN ID.....: (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT
 ORDIS CODES...: REC-004002 SSIE-GMA 4860 EPA -RB05590-01 TASK-V624 -03
 AP -624 DU -L110 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THE ORBES PROJECT IS TO CONDUCT AN INTEGRATED TECHNOLOGY ASSESSMENT OF ENERGY CONVERSION FACILITIES IN THE OHIO RIVER BASIN REGION. THE PAST YEAR HAS SEEN OVER ONE HUNDRED RESEARCHERS AT EIGHT CAMPUSES IN THE REGION COLLECTING AND ANALYZING BASELINE DATA IN RELEVANT AREAS IN ORDER TO CONDUCT A FIRST-CUT OR "MINI"-ASSESSMENT. THE SECOND YEAR OF THE PROJECT (PHASE II) IS TO BE DEVOTED TO IDENTIFYING, REQUESTING, AND SUPERVISING RESEARCH IN AREAS DEEMED INADEQUATELY COVERED IN THE FIRST YEAR. THE PROJECT HAS BEEN RECONSTRUCTED SO THAT THERE IS A CORE TEAM OF THIRTEEN RESEARCHERS FROM TEN INSTITUTIONS (THE ORBES REGION HAS BEEN EXPANDED TO INCLUDE WEST VIRGINIA AND WESTERN PENNSYLVANIA IN ADDITION TO LAST YEAR'S OHIO, INDIANA, ILLINOIS AND KENTUCKY AREAS) WHO WILL PERFORM THE INTEGRATED TECHNOLOGY ASSESSMENT. THE CORE TEAM REPRESENTS A VARIETY OF RELEVANT DISCIPLINES CAPABLE OF TAKING ON THE ASSESSMENT TASK. THE UNIVERSITY OF KENTUCKY'S TWO CORE TEAM MEMBERS REPRESENT THE DISCIPLINES OF SOCIOLOGY AND ECONOMIC GEOGRAPHY. IN ADDITION, THE ANTHROPOLOGIST IS HELPING CONDUCT THE SOCIAL IMPACT ASSESSMENT OF INCREASED POWER PRODUCTION IN THE ORBES AREA. CONTRIBUTIONS TO BE EXPECTED INCLUDE A STUDY OF THE IMPACT OF SERVICE AREAS ON ELECTRICAL POWER GENERATION AND TRANSMISSION AND FURTHER REFINEMENT OF THE SOCIAL IMPACT ASSESSMENT ANALYSIS. THE LATTER STUDY INCLUDES AN OPERATIONALIZATION OF AN ENVIRONMENTAL ORIENTATION PARADIGM, PREPARATION OF DEMOGRAPHIC PROFILES OF COUNTIES LIKELY TO BE IMPACTED BY ENERGY CONVERSION FACILITIES, CLASSIFICATION OF COUNTIES BY ENVIRONMENTAL ORIENTATION AND AN IMPACT ASSESSMENT. THIS WORK WILL BE USED COOPERATIVELY AND INTEGRATIVELY BY THE CORE TEAM TO PERFORM THE TECHNOLOGY ASSESSMENT.

****PROJECT: 04003-PHASE II, OHIO RIVER BASIN ENERGY STUDY**

STARTING/ COMPLETION DATE : 11/77 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 30000
 TASK CODE=V624 -04 **EPA=R805589-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: L SMITH EPA/HDQTRS- OEMI
 INVESTIGATOR.: SI GORDON OHIO STATE UNIV
 O FISCH OHIO STATE UNIV
 MILESTONES.... 09/77 -GRANT AWARDED
 11/77 -PROJECT INITIATION
 10/78 -PROJECT TERMINATION
 PLAN ID..... (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT
 ORDIS CODES... RECN-004003 SSIE-GMA 4862 EPA -R805589-01 TASK-V624 -04
 AP -624 DU -L110 LABT-EMI

ABSTRACT..... THIS PROJECT IS THE SECOND PHASE OF A TECHNOLOGY ASSESSMENT OF ENERGY DEVELOPMENT IN THE OHIO RIVER BASIN. A CORE TEAM COMPOSED OF MEMBERS FROM NINE DIFFERENT UNIVERSITY CAMPUSES IN SIX STATES WILL DIRECT AND DELINEATE RESEARCH ACTIVITIES IN THIS PHASE OF THE PROGRAM. FIRST, REPORTS FROM PHASE I OF THE PROJECT WILL BE REVIEWED AND KEY ISSUES FOR FURTHER RESEARCH IDENTIFIED. THE BASE LINE DATA FOR THE STUDY WILL BE REFINED AND A NEW SET OF ENERGY FACILITY SITING CRITERIA DEVELOPED. THE CORE TEAM WILL THEN REVIEW BASIC TECHNOLOGICAL, SOCIOLOGICAL, AND DEMOGRAPHIC ASSUMPTIONS AND CREATE A SET OF ENERGY DEVELOPMENT SCENARIOS RELATIVE TO COAL MINING, TRANSPORTATION, AND CONVERSION FACILITIES, AND TO OTHER TYPES OF ENERGY FACILITIES IN THE STUDY REGION. GIVEN THESE SCENARIOS, THE IMPACTS OF THE ENERGY FACILITIES ON THE PHYSICAL ENVIRONMENT, SOCIOECONOMIC CONDITIONS, ECOLOGICAL FACTORS, PUBLIC HEALTH, INSTITUTIONS, LAND USE, AND THE QUALITY OF LIFE WILL BE ASSESSED. THE PHASE II IMPACT ANALYSIS WILL EMPHASIZE THE TRACING OF SECOND- AND HIGHER-ORDER IMPACTS AND THE INTERRELATIONSHIPS AMONG THEM. BASED UPON THE IMPACT ASSESSMENT, A RANGE OF POSSIBLE OPTIONS UNDER EACH SCENARIO WILL BE DETERMINED.

****PROJECT: 04004-EXPERIMENTAL MANAGEMENT PLAN FOR OHIO RIVER BASIN ENERGY STUDY - IMPACT ASSESSMENT OF EFFECT OF ENERGY CONVERSION FACILITIES (ABBREV**

STARTING/ COMPLETION DATE : 11/77 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=V624 -05 **EPA=R805588-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: L SMITH EPA/HDQTRS- OEMI
 INVESTIGATOR.: JJ STUKEL UNIV OF ILLINOIS
 BR KEENAN UNIVERSITY OF ILLINOIS SCH OF ENG/CIV ENG DEPT
 MILESTONES.... 09/77 -GRANT AWARDED
 11/77 -PROJECT INITIATION
 10/78 -PROJECT TERMINATION
 PLAN ID..... (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT
 ORDIS CODES... RECN-004004 SSIE-GMA 4858 EPA -R805588-01 TASK-V624 -05
 AP -624 DU -L110 LABT-EMI

ABSTRACT..... OBJECTIVES: THE EXPERIMENTAL MANAGEMENT PLAN FOR THE OHIO RIVER BASIN ENERGY STUDY (ORBES), PHASE II: AN IMPACT ASSESSMENT OF THE EFFECT OF ENERGY CONVERSION FACILITIES IN THE OHIO RIVER BASIN IS A CONTINUATION OF THE MANAGEMENT OF A COMPREHENSIVE, POLICY ORIENTED TECHNOLOGY ASSESSMENT ADDRESSING THE BROAD-SCALE ENVIRONMENTAL, PUBLIC HEALTH, ECONOMIC, INSTITUTIONAL, AND SOCIAL EFFECTS OF LOCATING VARIOUS COMBINATIONS OF ENERGY CONVERSION AND SUPPORT FACILITIES IN THE OHIO RIVER BASIN. APPROACH: THE INTEGRATED TECHNOLOGY ASSESSMENT IS BEING CONDUCTED BY AN INTERDISCIPLINARY, INTERINSTITUTIONAL (EIGHT STATE UNIVERSITIES IN THE SIX STUDY-REGION STATES OF ILLINOIS, INDIANA, KENTUCKY, OHIO, PENNSYLVANIA, AND WEST VIRGINIA) TEAM, WITH SUPPORT RESEARCH PERFORMED BY OTHER PERSONNEL ON A SCHEDULE TO BEST FIT THE RESEARCH NEEDS OF THE TECHNOLOGY ASSESSMENT TEAM. THE MANAGEMENT OF THIS RESEARCH WILL INVOLVE A COMPLEX ARRANGEMENT TO BEST COORDINATE EFFORTS AND FURTHER THE ACHIEVEMENT OF RESEARCH GOALS. A FOUR-PERSON PROJECT OFFICE WILL PERFORM DAY-TO-DAY COORDINATION, WHILE A SEVEN-PERSON MANAGEMENT TEAM CONSISTING OF THE EXPERIMENTAL MANAGEMENT PLAN CO-PRINCIPAL INVESTIGATORS AND FIVE U.S. ENVIRONMENTAL PROTECTION AGENCY REPRESENTATIVES WILL PROVIDE LONG-TERM AND POLICY GUIDANCE. CURRENT PLANS AND/OR PROGRESS: IN PHASE I OF THE STUDY, THE PROJECT OFFICE AND MANAGEMENT TEAM COORDINATED A SIMILAR STUDY, ALTHOUGH THAT PHASE INVOLVED THREE PRELIMINARY ASSESSMENT TEAMS DRAWN FROM SEVEN UNIVERSITY CAMPUSES (WHOSE REPORTS WERE THEN INTEGRATED BY THE PROJECT OFFICE). THE EXPERIENCE GAINED DURING PHASE I WILL BE UTILIZED IN PHASE II. IN PHASE II, DATA AND ASSESSMENTS MADE IN THE FIRST YEAR WILL BE DRAWN UPON, AND INADEQUACIES IDENTIFIED WILL BE CORRECTED.

****PROJECT: 04005-OHIO RIVER BASIN ENERGY STUDY (ORBES)**

STARTING/ COMPLETION DATE : 11/77 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=V624 -07 **EPA-R805585-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: L SMITH EPA/HDOQRS- OEMI SCH OF LAW
 INVESTIGATOR.: VP CARDI WEST VIRGINIA UNIV
 MILESTONES...: 09/77 -GRANT AWARDED
 11/77 -PROJECT INITIATION
 10/78 -PROJECT TERMINATION
 PLAN ID.....: (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT
 ORDIS CODES...: REC-N-004005 SSIE-GMA 4866 EPA -R805585-01 TASK-V624 -07
 AP -624 DU -L110 LABT-EMI
 ABSTRACT.....: TO COLLECT BASIC INFORMATION ABOUT THE INSTITUTIONAL, SOCIO-ECONOMIC, PHYSICAL, BIOLOGICAL, INDUSTRIAL, MINING AND AGRICULTURAL MAKE-UP OF WEST VIRGINIA AND THE OHIO RIVER BASIN TO ENABLE AN INTERDISCIPLINARY TECHNOLOGY ASSESSMENT TEAM TO PREDICT THE IMPACT OF FUTURE (1985 AND 2000 A.D.) ENERGY DEMANDS AND PRODUCTION ON THE ECONOMY, SOCIAL PATTERNS AND THE ENVIRONMENT OF THE OHIO RIVER BASIN, INCLUDING WEST VIRGINIA, INTERDISCIPLINARY ASSESSMENT BY 9 PUBLIC UNIVERSITIES IN THE SIX STATE AREA OF PENNSYLVANIA, WEST VIRGINIA, OHIO, KENTUCKY, INDIANA AND ILLINOIS. THE FIRST OF THREE YEARS, INVOLVING DATA COLLECTION, AND GROWTH PREDICTION HAS BEEN COMPLETED FOR ALL BUT WEST VIRGINIA AND PENNSYLVANIA, BOTH OF WHICH ARE JOINING THE PROJECT IN THE SECOND YEAR.

****PROJECT: 04008-IMPACT ASSESSMENT OF ENERGY CONVERSION FACILITIES IN THE OHIO RIVER BASIN - PHASE II**

STARTING/ COMPLETION DATE : 11/77 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 30000
 TASK CODE=V624 -08 **EPA-R805569-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: L SMITH EPA/HDOQRS- OEMI
 INVESTIGATOR.: HT SPENCER UNIV OF LOUISVILLE FOUND INC
 CA LEUTHART UNIV OF LOUISVILLE FOUND INC
 MILESTONES...: 10/77 -GRANT AWARDED
 11/77 -PROJECT INITIATION
 10/78 -PROJECT TERMINATION
 PLAN ID.....: (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT
 ORDIS CODES...: REC-N-004006 SSIE-GMA 4861 EPA -R805569-01 TASK-V624 -08
 AP -624 DU -L110 LABT-EMI
 ABSTRACT.....: OBJECTIVES: THE OHIO RIVER BASIN ENERGY STUDY (ORBES) WAS INITIATED TO ASSESS CHANGES THAT MAY OCCUR IN THE VARIOUS SECTORS OF SOCIETY, INDUSTRY, AND ENVIRONMENT AS A RESULT OF FUTURE INCREASES IN NUMBER OF ENERGY CONVERSION FACILITIES. DURING THE SECOND YEAR OF THIS STUDY EACH PARTICIPATING RESEARCH GROUP WILL ADDRESS ITSELF TO ONE OF THE AREAS THOUGHT TO BE AFFECTED. THE GROUP FROM THE UNIVERSITY OF LOUISVILLE WILL ADDRESS ASPECTS OF WATER QUALITY, WATER QUANTITY, AND SPECIAL AQUATIC HABITATS. APPROACH: THE ASSESSMENTS WILL BE MADE BY COMPILATION AND ANALYSIS OF EXISTING DATA POSSIBLY SUPPORTED BY SPECIAL STUDIES OF SPECIFIC AREAS WHERE EXISTING DATA IS WEAK OR LACKING. CURRENT PLANS AND/OR PROGRESS: PARTICIPANTS FROM SEVEN MIDWESTERN UNIVERSITIES DIVIDED INTO THREE ASSESSMENT TEAMS HAVE SUBMITTED INDEPENDENT PRELIMINARY FIRST-CUT ASSESSMENTS OF THE CHANGES WHICH MAY OCCUR AS A RESULT OF THESE DEVELOPMENTS. THESE ASSESSMENTS WILL BE CONDENSED INTO ONE MAJOR DOCUMENT WHICH IS TO BE SUBMITTED TO CONGRESS IN JULY 1977.

****PROJECT: 04007-COST/BENEFIT OF FUEL REPROCESSING**

STARTING/ COMPLETION DATE : 06/77 - 08/78 : FUNDING : ESTIMATED - FY77 / \$ 28259
 TASK CODE=V624 -09 **EPA-R804948-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: L SMITH EPA/HDOQRS- OEMI
 INVESTIGATOR.: M RESNIKOFF STATE UNIV OF NEW YORK BUFFALO CAMPUS
 C SMITH STATE UNIV OF NEW YORK BUFFALO CAMPUS
 PLAN ID.....: (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT
 ORDIS CODES...: REC-N-004007 SSIE-GMA 4863 EPA -R804948-01 TASK-V624 -09
 AP -624 DU -L110 LABT-EMI
 ABSTRACT.....: A FULL COST/BENEFIT ANALYSIS OF THE NUCLEAR FUEL REPROCESSING INDUSTRY IS PROPOSED. THE ANALYSIS WILL COMPARE, OVER TIME, THE COSTS OF REPROCESSING AND ASSOCIATED CHARGES VERSUS THE VALUE OF THE RECOVERED MATERIALS, URANIUM AND PLUTONIUM. THE EFFECTS OF YELLOWCAKE AVAILABILITY, PROPERTIES OF PLUTONIUM RECYCLE FUELS, SAFEGUARD AND ENVIRONMENTAL COSTS ON THE VALUE OF THE RECOVERED PRODUCTS WILL ALSO BE INCLUDED IN THE ANALYSIS. THE STUDY WILL PREDICT THE TIMING FOR ENTRY OF A COMMERCIAL NUCLEAR FUEL REPROCESSING INDUSTRY.

REPORT: ORD CONV (VERSION V2.0) UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 * OFFICE OF RESEARCH AND DEVELOPMENT *

RUN DATE: 04/11/79 * O R D I S DATA EXTRACT *

****PROJECT: 04008-SOCIOECONOMIC & ENVIRONMENTAL IMPACTS OF A PROPOSED INCREASED CONCENTRATION OF ENERGY CONVERSION FACILITIES**

STARTING/ COMPLETION DATE : 07/76 - 07/77 : FUNDING : ESTIMATED - FY77 / \$ 42100
 TASK CODE=V624 -10 **EPA-R804848-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: L SMITH EPA/HDOQRS- OEMI SCH OF ENG/CIV ENG DEPT
 INVESTIGATOR.: JJ STUKEL UNIV OF ILLINOIS
 MILESTONES...: 07/76 -PROJECT INITIATION
 07/77 -PROJECT TERMINATION
 PLAN ID.....: (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT
 ORDIS CODES...: REC-N-004008 SSIE-GMA 3318 1 EPA -R804848-01 TASK-V624 -10
 AP -624 DU -L110 LABT-EMI

ABSTRACT..... THIS SET OF STUDIES REPRESENTS A PORTION OF A MULTI-INSTITUTIONAL POLICY-ORIENTED TECHNOLOGY ASSESSMENT OF THE SOCIOECONOMIC AND ENVIRONMENTAL IMPACTS WHICH MIGHT RESULT FROM A PROPOSED INCREASED CONCENTRATION OF ENERGY CONVERSION FACILITIES WITHIN THE OHIO RIVER BASIN. UTILIZING THE BEST AVAILABLE DATA BASES, THESE STUDIES WILL ATTEMPT TO ADDRESS THE BROAD-SCALE ENVIRONMENTAL, INSTITUTIONAL, ECONOMIC AND SOCIAL EFFECTS OF VARIOUS FUTURE COMBINATIONS OF ENERGY FACILITIES (I.E., COAL-BASED PLANTS PRODUCING SYNTHETIC FUEL, AS WELL AS NUCLEAR AND COAL-FIRED ELECTRIC POWER GENERATING PLANTS) AND THEIR REQUIRED SUPPORT FACILITIES (I.E., COAL MINING, PROCESSING AND TRANSPORTATION; ASH AND SLUDGE DISPOSAL FACILITIES; NUCLEAR FUEL AND REACTOR WASTE TRANSPORTATION FACILITIES; AND ENERGY TRANSPORTATION SYSTEMS, INCLUDING ELECTRICAL TRANSMISSION SYSTEMS) THAT MIGHT BE BUILT AND OPERATED IN THIS REGION IN THE FUTURE. THE PRINCIPAL OBJECTIVES OF THIS ASSESSMENT ARE (1) TO ASSIST IN OUTLINING THE FULL RANGE OF POLICY OPTIONS FOR DEALING WITH SELECTED KINDS OF DEVELOPMENT, ALTERNATIVE LEVELS OF DEVELOPMENT AND THEIR POSSIBLE UNDESIRABLE EFFECTS, AND ALTERNATIVE TECHNOLOGICAL LEVELS OF ENVIRONMENTAL CONTROLS; AND (2) TO ANALYZE THE PROBABLE IMPACTS THAT WOULD RESULT FROM IMPLEMENTING EACH OPTION IN ITS TOTAL FRAMEWORK WITH PUBLIC HEALTH AND WELFARE. THE FULL RANGE OF PRIMARY, SECONDARY, AND HIGHER-ORDER EFFECTS WILL BE CONSIDERED.

****PROJECT: 04009-OHIO RIVER BASIN ENERGY STUDY, PHASE II**

STARTING/ COMPLETION DATE : 11/77 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 30000
 TASK CODE=V624 -11 **EPA=R805603-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: L SMITH EPA/HQOTRS- OEMI
 INVESTIGATOR.: RE BAILEY PURDUE UNIV
 PLAN ID..... (AP-624)(DU-L110) CONSERVATION AND UTILIZATION TECHNOLOGY ASSESSMENT SCH OF ENG/NUCLEAR ENG
 ORDIS CODES.: REC-004009 SSIE-GMA 4859 EPA -R805603-01 TASK-V624 -11
 AP -624 DU -L110 LABT-EMI

ABSTRACT..... THIS STUDY IS PART OF A TECHNOLOGY ASSESSMENT OF THE SOCIAL, ECONOMIC AND ENVIRONMENTAL CONSEQUENCES TO BE EXPECTED FROM AN INCREASED CONCENTRATION OF ENERGY FACILITIES WITHIN THE OHIO RIVER BASIN.

****PROJECT: 01473-PREPARATION OF GUIDELINE FOR ADJUSTMENT OF ATMOSPHERIC GAS BURNERS FOR RESIDENTIAL AND COMMERCIAL HEATING**

STARTING/ COMPLETION DATE : 09/77 - 06/78 : FUNDING : ESTIMATED - FY77 / \$ 26731
 TASK CODE=F624A-002 **EPA=68-02-2653 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: RE HALL EPA/IERL - RTP
 INVESTIGATOR.: DW LOCKLIN BATTELLE MEMORIAL INST
 MILESTONES...: 09/77 -CONTRACT START DATE
 01/78 -COMPLETE GUIDELINE DRAFT FOR INDUSTRY REVIEW
 04/78 -COMPLETE HOMEOWNERS BULLETIN DRAFT
 06/78 -COMPLETE GUIDELINE (USERS MANUAL)
 PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES.: REC-001473 SSIE-GMA 4157 EPA -68-02-2653 TASK-F624A-002
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... THE PROGRAM OBJECTIVE IS TO PROVIDE GUIDELINES FOR ADJUSTMENT OF RESIDENTIAL AND COMMERCIAL ATMOSPHERIC GAS BURNERS. THE DOCUMENT WILL BE USED BY SERVICE TECHNICIANS TO ADJUST GAS BURNERS FOR REDUCED AIR POLLUTANT EMISSIONS AND IMPROVED EFFICIENCY. THE GUIDELINE CAN ALSO BE USED FOR TRAINING GAS BURNER SERVICE TECHNICIANS. THE APPROACH WILL INCLUDE SUB-CONTRACTING TO GAS INDUSTRY EXPERTS WHO ARE FAMILIAR WITH GAS BURNER OPERATION. THERE WILL BE AN INDEPENDENT INDUSTRY REVIEW BEFORE FINAL PUBLICATION. A HOMEOWNERS' BULLETIN SHALL ALSO BE PREPARED FOR FINAL EDITING AND PRINTING BY EPA.

REPORT: ORDCONV (VERSION V2.0) UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 * OFFICE OF RESEARCH AND DEVELOPMENT *

RUN DATE: 04/11/79

* O R D I S D A T A E X T R A C T *

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****PROJECT: 01480-APPLICATION OF ADVANCED COMBUSTION MODIFICATION TECHNIQUES TO SELECTED INDUSTRIAL PROCESS EQUIPMENT**

STARTING/ COMPLETION DATE : 08/77 - 08/79 : FUNDING : ESTIMATED - FY77 / \$ 721146
 TASK CODE=F624A-007 **EPA=68-02-2645 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: RE HALL EPA/IERL - RTP
 INVESTIGATOR.: DR BARTZ K V B ENG INC
 RE THOMPSON K V B ENG INC
 SC HUNTER K V B ENG INC
 MILESTONES...: 08/77 -CONTRACT START DATE
 09/77 -SUBMIT WORK PLAN
 03/78 -COMPLETE TEST SITE SELECTION
 05/78 -SUB-SCALE TESTS COMPLETED
 08/78 -INTERIM REPORT COMPLETED
 05/79 -FULL SCALE TESTS COMPLETED
 07/79 -FINAL REPORT SUBMITTED
 08/79 -GUIDELINE (USERS MANUAL) SUBMITTED
 08/79 -DATA SUPPLEMENT SUBMITTED

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES.: REC-001480 SSIE-GMA 4164 EPA -68-02-2645 TASK-F624A-007
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... THE OBJECTIVES ARE TO PROVIDE INFORMATION ABOUT THE EFFECT OF DETAILED COMBUSTION MODIFICATION TECHNIQUES ON THE EMISSIONS AND PERFORMANCE OF SELECTED INDUSTRIAL PROCESS COMBUSTION EQUIPMENT. TECHNOLOGY WHICH HAS BEEN SUCCESSFULLY DEVELOPED FOR REDUCING POLLUTANTS FROM BOILERS WILL BE APPLIED TO OTHER TYPES OF STATIONARY COMBUSTION EQUIPMENT. THE APPROACH WILL BE TO PERFORM FEASIBILITY TESTS ON SUB-SCALE EQUIPMENT, WHERE POSSIBLE. THESE TESTS WILL INCLUDE TECHNIQUES SUCH AS MODIFIED FUEL INJECTION, CONTROLLED ENTRAINMENT, STEAM INJECTION, CONTROLLED HEAT REMOVAL, AND FLUE GAS RECIRCULATION. APPROXIMATELY SIX UNITS WILL BE SELECTED FOR FOLLOW-UP FULL SCALE TESTS. PRODUCTS WILL INCLUDE A FINAL REPORT, DATA SUPPLEMENT, AND INSTRUCTIONAL GUIDELINE FOR MANUFACTURERS AND OPERATORS OF EACH EQUIPMENT TYPE TESTED.

****PROJECT: 01481-FIELD TESTING - APPLICATION OF COMBUSTION MODIFICATION TECHNOLOGY TO INDUSTRIAL COMBUSTION EQUIPMENT**

STARTING/ COMPLETION DATE : 01/76 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 55595
TASK CODE=F624A-008 **EPA=68-02-2144 ** (CNTR.) PRIOR FY76 / \$ 797713

EPA OFFICER.: RE HALL
INVESTIGATOR.: DR BARTZ
SC HUNTER
MILESTONES....

EPA/IERL - RTP
K V B ENG INC
K V B ENG INC

01/76 -CONTRACT START DATE
03/76 -EQUIPMENT SURVEY
09/76 -TEST UNIT SELECTION
03/77 -FIELD TEST COMPLETED FOR INDUSTRIAL PROCESS EQUIPMENT
05/77 -EXTENSIVELY MODIFIED BOILERS TESTED
10/77 -FINAL REPORT
10/77 -MODIFIED BOILER REPORT
10/77 -DATA SUPPLEMENT
10/77 -DATA CODING

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
ORDIS CODES.: RECN-001481 SSIE-GMA 2708 1 EPA -68-02-2144 TASK-F624A-008
AP -624A DU -L110 LABT-EMI

ABSTRACT..... THE PROGRAM OBJECTIVE IS TO EVALUATE THE EFFECTIVENESS OF COMBUSTION MODIFICATIONS AS MEANS OF EMISSIONS REDUCTION AND THERMAL EFFICIENCY IMPROVEMENT ON INDUSTRIAL COMBUSTION EQUIPMENT INCLUDING KILNS, OVENS, DRYERS, PROCESS FURNACES AND HEATERS, BOILERS, STATIONARY ENGINES AND GAS TURBINES. THE APPROACH WILL INVOLVE A FIELD TEST PROGRAM TO MEASURE EMISSIONS OF NO, NOX, SO2, SO3, CO, GASEOUS HYDROCARBONS, PARTICULATES, TRACE ELEMENTS, ORGANICS (POM, PCB) SULFATES AND NITRATES. BASELINE TESTS WILL BE CONDUCTED ON ABOUT TWENTY-FIVE REPRESENTATIVE COMBUSTION DEVICES AND COMBUSTION MODIFICATIONS WILL BE IMPLEMENTED TO DETERMINE THE INFLUENCE ON EMISSIONS AND EFFICIENCY. THESE MODIFICATIONS INCLUDE LOWERED EXCESS COMBUSTION AIR, STAGED COMBUSTION, REDUCED AIR PREHEAT, FUEL CHANGES, WATER INJECTION AND FLUE GAS RECIRCULATION. THE PROGRAM IS AN EXTENSION OF WORK CONDUCTED ON EPA CONTRACT 68-02-1074 THAT DEALT WITH INDUSTRIAL BOILERS. COMBUSTION MODIFICATION TECHNOLOGY THAT WAS FOUND EFFECTIVE ON BOILERS WILL BE EXTENDED TO OTHER INDUSTRIAL EQUIPMENT, ALTHOUGH EXTENSIVE TESTS ON TWO INDUSTRIAL BOILERS EQUIPPED WITH STAGED AIR AND/OR FLUE GAS RECIRCULATION ARE INCLUDED.

****PROJECT: 01482-FIELD TESTING - APPLICATION OF COMBUSTION MODIFICATION TO CONTROL POLLUTANT EMISSIONS FROM POWER GENERATION COMBUSTION SYSTEMS**

STARTING/ COMPLETION DATE : 06/74 - 12/78 : FUNDING : ESTIMATED - FY77 / \$ 338095
TASK CODE=F624A-009 **EPA=68-02-1415 ** (CNTR.) PRIOR FY76 / \$ 1223150

EPA OFFICER.: RE HALL
INVESTIGATOR.: AR CRAWFORD
W BARTOK
EH MANNY
MILESTONES....

EPA/IERL - RTP
EXXON RESEARCH & ENGINEERING CO
EXXON RESEARCH & ENGINEERING CO
EXXON RESEARCH & ENGINEERING CO

06/74 -CONTRACT START DATE
04/77 -COMPLETE FINAL REPORT ON INITIAL SEVEN BOILERS
09/77 -COMPLETE HORIZONTALLY-OPPOSED BOILER CORROSION TESTS
11/77 -COMPLETE FINAL REPORT ON ALL EQUIPMENT EMISSION TESTS
12/77 -COMPLETE GUIDELINES (USERS MANUALS)
01/78 -COMPLETE DATA SUPPLEMENT
04/79 -COMPLETE SINGLE-WALL BOILER CORROSION TESTS

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
ORDIS CODES.: RECN-001482 SSIE-GMA 2707 1 EPA -68-02-1415 TASK-F624A-009
AP -624A DU -L110 LABT-EMI

ABSTRACT..... THE PURPOSE OF THIS STUDY IS TO FIELD TEST POWER GENERATION COMBUSTION EQUIPMENT INCLUDING UTILITY BOILERS, GAS TURBINES, AND STATIONARY I. C. ENGINES. EMPHASIS WILL BE PLACED ON UTILITY BOILERS FIRING COAL, BUT THE STUDY WILL INCLUDE TESTS OF GAS- AND OIL-FIRED BOILERS AND BOILERS CAPABLE OF FIRING TWO OR MORE FUELS SIMULTANEOUSLY. TESTS WITH SIMULTANEOUS FIRING OF WASTE AND FOSSIL FUELS SHALL ALSO BE INCLUDED. EMISSIONS TO BE MEASURED ARE OXIDES OF NITROGEN, OXIDES OF SULFUR, HYDROCARBONS, CARBON MONOXIDE, CARBON DIOXIDE, OXYGEN, OPACITY, SULFATES, NITRATES, PARTICULATE (MASS AND SIZE DISTRIBUTION), POM, AND TRACE ELEMENTS. THE EFFECT OF COMBUSTION MODIFICATION ON AIR POLLUTANT EMISSIONS AND COMBUSTION EFFICIENCY WILL BE DETERMINED. ALSO, THE EFFECT OF MODIFIED OPERATION ON EQUIPMENT PERFORMANCE (E.G. SLAGGING, FOULING, STEAM TEMPERATURE CONTROL) WILL BE INVESTIGATED. ONE PRIMARY GOAL IS TO DETERMINE THE EFFECT OF STAGED COMBUSTION IN COAL-FIRED BOILERS ON TUBE WALL CORROSION RATES. STAGED COMBUSTION COMBINED WITH LOW EXCESS AIR FIRING IS THE MOST ATTRACTIVE COMBUSTION MODIFICATION COMBINATION BECAUSE IT IS AN EFFECTIVE METHOD OF REDUCING NOX AND IS RELATIVELY EASY AND INEXPENSIVE TO IMPLEMENT. HOWEVER, SOME EXPERTS SUSPECT THAT THE REDUCING ATMOSPHERE IN THE BURNER ZONE INCREASES TUBE WALL CORROSION RATES. THE CONTRACTOR WILL USE THREE METHODS FOR MEASURING CORROSION RATES: (1) CORROSION PROBES FOR AN EASY, INEXPENSIVE, BUT PROBABLY INACCURATE METHOD, (2) ULTRASONIC TUBE WALL MEASUREMENT WHICH IS MORE COSTLY BUT SHOULD PROVIDE AN ACCURATE MAPPING OF THE FURNACE TUBE WALL SURFACE, AND (3) TEST PANELS WHICH WILL BE WELDED INTO THE BOILER TUBE WALL IN AREAS WHERE EXTENSIVE CORROSION IS ANTICIPATED. THE TEST PANELS WILL BE REMOVED AFTER A 6 TO 12 MONTH PERIOD FOR PRECISE MEASUREMENTS.

****PROJECT: 01486-ENVIRONMENTAL AND ENERGY ASSESSMENT OF AFTERBURNER COMBUSTION SYSTEMS**

STARTING/ COMPLETION DATE : 03/77 - 02/80 : FUNDING : ESTIMATED - FY77 / \$ 56107
 TASK CODE=F624A-013 **EPA-68-02-2629 ** (CNTR.) PRIOR FY76 / \$ 50000

EPA OFFICER.: JH WASSER EPA/IERL - RTP
 INVESTIGATOR.: RE BARRETT BATTELLE MEMORIAL INST
 DA BALL BATTELLE MEMORIAL INST
 RH BARNES BATTELLE MEMORIAL INST
 AA PUTNAM BATTELLE MEMORIAL INST

MILESTONES...: 12/77 -PRELIMINARY ENVIRONMENTAL ASSESSMENT COMPLETED
 11/78 -LABORATORY STUDIES COMPLETED
 01/79 -FIELD TEST COMPLETED
 09/79 -ENVIRONMENTAL ASSESSMENT COMPLETED
 02/80 -STANDARD PRACTICE MANUAL COMPLETED

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: REC-001486 SSIE-GMA 4204 EPA -68-02-2629 TASK-F624A-013
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: BATTELLE-COLUMBUS IS CONDUCTING A PROGRAM TO ASSESS THE PERFORMANCE OF AFTERBURNER EMISSION CONTROL DEVICES BY EVALUATING (1) THE POTENTIAL OF AFTERBURNERS FOR REDUCING EMISSIONS; (2) THE POTENTIAL OF AFTERBURNERS GENERATING EMISSIONS; AND (3) THE EFFICIENT UTILIZATION OF FUEL IN AFTERBURNERS. AS IT RELATES TO EMISSION CONTROL. AFTERBURNER TYPES INCLUDED IN THE PROGRAM ARE DIRECT FLAME COMBUSTION AFTERBURNERS, THERMAL COMBUSTION AFTERBURNERS, AND CATALYTIC AFTERBURNERS. THE PROGRAM IS DIVIDED INTO TWO PHASES. PHASE I INCLUDES THE COLLECTION AND CORRELATION OF AVAILABLE DATA (FROM THE LITERATURE, FROM EPA SOURCE TESTS, FROM STATE AND LOCAL AGENCIES, ETC.) TO ASSESS THE STATE-OF-THE-ART OF AFTERBURNER APPLICATION TECHNOLOGY. PHASE II INCLUDES TWO TASKS THAT ARE DIRECTED AT GENERATING NEW DATA ON AFTERBURNER PERFORMANCE, AND TWO THAT ARE DIRECTED AT DOCUMENTING THE ENVIRONMENTAL AND ENGINEERING ASPECTS OF AFTERBURNER APPLICATION. THE EXPERIMENTAL TASKS ARE DIRECTED TOWARD OBTAINING NEW AFTERBURNER PERFORMANCE DATA IN THE FIELD AND THE LABORATORY, RESPECTIVELY. THE LAST TWO TASKS CONSIST OF UTILIZING THE DATA GENERATED IN THE EXPERIMENTAL PROGRAM TO COMPLETE AN ENVIRONMENTAL ASSESSMENT OF AFTERBURNERS AND TO DEVELOP A "STANDARD PRACTICE MANUAL" FOR USE BY ENGINEERS INVOLVED IN AFTERBURNER APPLICATION.

****PROJECT: 01494-INVESTIGATION OF AERODYNAMIC PHENOMENA IN POLLUTION CONTROL**

STARTING/ COMPLETION DATE : 03/75 - 03/77 : FUNDING : ESTIMATED - FY77 / \$ 5481
 TASK CODE=F624A-019 **EPA-68-02-1873 ** (CNTR.) PRIOR FY76 / \$ 405906

EPA OFFICER.: WS LANIER EPA/IERL - RTP
 INVESTIGATOR.: LJ SPADACCINI UNITED TECHNOLOGIES CORP
 CT BOWMAN UNITED TECHNOLOGIES CORP
 H MCDONALD UNITED TECHNOLOGIES CORP

MILESTONES...: 03/75 -INITIATE CONTRACT
 12/75 -COMPLETE GASEOUS FUEL EXPERIMENTS
 02/76 -COMPLETE PHASE I REPORT
 08/76 -COMPLETE LIQUID FUEL EXPERIMENTS
 12/76 -COMPLETE EXPERIMENTAL FINAL REPORT
 03/77 -COMPLETE DEVELOPMENT OF NUMERICAL ANALYSIS PROCEDURE
 08/77 -COMPLETE FINAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: REC-001494 SSIE-GMA 4152 EPA -68-02-1873 TASK-F624A-019
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: THE RESEARCH PROGRAM WILL INVESTIGATE AERODYNAMIC PHENOMENA IN THE CONTROL OF POLLUTANTS FROM GASEOUS AND HETEROGENEOUS COMBUSTION. THE PROGRAM HAS FOUR PRIMARY OBJECTIVES: (1) TO UTILIZE RECENTLY DEVELOPED OPTICAL AND PROBING TECHNIQUES TO OBTAIN DETAILED INFORMATION ON THE CHEMICAL AND PHYSICAL PROCESSES OCCURRING INSIDE A COMBUSTOR OPERATING ON GASEOUS AND LIQUID FUELS. (2) TO COMPARE EXPERIMENTAL OBSERVATIONS WITH RESULTS FROM A COMBUSTOR FLOW ANALYSIS (FREP CODE) TO FURTHER EVALUATE THE THEORETICAL MODEL. (3) TO FURTHER DEVELOP THE COMBUSTOR FLOW ANALYSIS FOR PREDICTING THE PHYSICAL AND CHEMICAL PROCESSES OCCURRING IN COMBUSTORS OPERATING ON GASEOUS AND LIQUID FUELS. (4) TO UTILIZE INFORMATION OBTAINED FROM THE EXPERIMENTAL AND THEORETICAL INVESTIGATION TO EVALUATE POTENTIAL EMISSION CONTROL STRATEGIES FOR GASEOUS AND LIQUID FUEL COMBUSTORS.

****PROJECT: 01497-PILOT SCALE EVALUATION OF ADVANCED COMBUSTION CONTROL TECHNIQUES FOR FOSSIL & WASTE FUELS**

STARTING/ COMPLETION DATE : 06/75 - 04/79 : FUNDING : ESTIMATED - FY77 / \$ 250000
 TASK CODE=F624A-022 **EPA-68-02-1885 ** (CNTR.) PRIOR FY76 / \$ 591973

EPA OFFICER.: DG LACHAPELLE EPA/IERL - RTP
 INVESTIGATOR.: RA BROWN ACUREX CORP AEROTHERM DIV
 C HARTMAN ACUREX CORP AEROTHERM DIV
 HB MASON ACUREX CORP AEROTHERM DIV
 JO WENDT UNIV OF ARIZONA SCH OF AGRIC
 DW PERSHING UNIV OF ARIZONA SCH OF AGRIC

MILESTONES...: 06/75 -INITIATE WORK
 12/75 -COMPLETE SYSTEM SHAKEDOWN
 06/77 -COMPLETE CONTROL TECHNOLOGY TESTS WITH COAL
 07/77 -INITIATE COAL/OIL SLURRY TESTS
 09/77 -COMPLETE COAL/OIL SLURRY TESTS
 10/77 -INITIATE WASTE FUEL STUDIES

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: REC-001497 SSIE-GMA 4165 EPA -68-02-1885 TASK-F624A-022
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THIS EXPERIMENTAL RESEARCH PROJECT IS TO DEVELOP ADVANCED LOW EMISSION HIGH EFFICIENCY COMBUSTION TECHNIQUES FOR APPLICATION TO INDUSTRIAL AND UTILITY BOILERS FIRING FOSSIL AND WASTE FUELS. PRIMARY EMPHASIS WILL BE ON CONTROL OF OXIDES OF NITROGEN (NOX) THROUGH MODIFICATION OF COMBUSTION CONDITIONS. THE FACILITY IS A SUBSCALE VERSATILE FURNACE, WITH CAPACITY OF 3 X 10 TO THE 6TH POWER BTU/HR, CAPABLE OF FIRING A VARIETY OF SOLID, LIQUID AND GASEOUS FUELS. THE FURNACE MAY BE OPERATED EITHER IN THE WALL FIRING MODE, USING UP TO 10 INDIVIDUAL BURNERS, OR IN THE TANGENTIAL, CORNER, FIRING MODE USING UP TO 24 INDIVIDUAL FUEL/AIR NOZZLES. THE RESEARCH BURNERS FOR SINGLE WALL OR OPPOSED WALL FIRING ARE OF A VARIABLE SWIRL DOUBLE CONCENTRIC DESIGN WITH CAPACITIES OF EITHER 300,000 BTU/HR OR 1.5 X 10 TO THE 6TH POWER BTU/HR. THE FIRST PHASE EFFORT WILL FOCUS ON NOX CONTROL TECHNIQUES FOR CONVENTIONAL FOSSIL FUELS, PRIMARILY PULVERIZED COAL AND RESIDUAL OIL. INITIALLY, THE COMBUSTION CHARACTERISTICS OF THE FURNACE WILL BE STUDIED TO ESTABLISH THE CORRESPONDENCE TO FULL-SCALE UTILITY AND INDUSTRIAL BOILERS. SUBSEQUENT TESTING WILL OPTIMIZE NOX CONTROL THROUGH TWO-STAGE COMBUSTION, FLUE GAS RECIRCULATION AND LOW EXCESS AIR FIRING FOR THE WALL FIRED AND TANGENTIALLY FIRED CONFIGURATIONS. EMPHASIS WILL BE GIVEN TO IDENTIFICATION OF OPTIMUM STAGING CONDITIONS FOR REDUCTION OF NOX FROM COAL FIRED BOILERS. THE SECOND PHASE PROGRAM WILL EXPLORE NOX CONTROL TECHNIQUES FOR THE FIRING OF MIXED CONVENTIONAL FUELS, NEW ALTERNATE FUELS, WASTE FUELS, AND MIXTURES OF CONVENTIONAL FUELS WITH ALTERNATE OR WASTE FUELS.

****PROJECT: 01499-EVALUATION OF POLLUTION EMISSIONS FROM INDUSTRIAL BURNERS USING LOW-MEDIUM BTU GASES FROM COAL**

STARTING/ COMPLETION DATE : 06/77 - 08/78 : FUNDING : ESTIMATED - FY77 / \$ 161462
 TASK CODE=F624A-023 **EPA=68-02-2643 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: DG LACHAPELLE EPA/IERL - RTP
 INVESTIGATOR.: DH LARSON INST. OF GAS TECHNOLOGY
 RT WAIBEL INST. OF GAS TECHNOLOGY
 E FLEMING INST. OF GAS TECHNOLOGY
 MILESTONES.... 06/77 -WORK INITIATED
 06/77 -COMPLETE BASELINE TESTS WITH NATURAL GAS
 09/77 -COMPLETE PBB TESTS WITH "DIRTY" GASES
 01/78 -COMPLETE GMCB TESTS WITH "DIRTY" GASES
 02/78 -FINAL REPORT
 PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... RECN-001499 SSIE-GMA 4159 EPA -68-02-2643 TASK-F624A-023
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... OBJECTIVES: THE WORK IS DESIGNED TO EVALUATE THE SEVERITY OF NOX EMISSIONS FROM COMBUSTING "DIRTY" LOW- AND INTERMEDIATE-BTU GASES. IT WAS CONCLUDED FROM AN ENVIRONMENTAL ASSESSMENT OF COMMERCIAL GASIFICATION PROCESSES THAT THERE ARE TWO DIFFERENT GROUPS OF "DIRTY" OFF-GAS IN TERMS OF POTENTIAL SOURCES OF NOX. AMMONIA IS CONTAINED IN BOTH OF THESE GROUPS. GROUP DIFFERENTIATION IS BASED ON THE TYPE AND CONCENTRATION OF TAR-OILS AND PARTICULATES. APPROACH: IN ORDER TO KEEP THE PROPOSED WORK PLAN WITHIN THE PROGRAM'S OBJECTIVE OF PROBLEM DEFINITION, WE WILL INVESTIGATE ONE GAS WITH THE MAXIMUM NUMBER OF POTENTIAL NOX SOURCES (AMMONIA, TAR-OILS AND CHAR) AT BOTH AN INTERMEDIATE- (OXYGEN) AND LOW- (AIR) BTU HEATING VALUE. THE GAS PROPOSED FOR TESTING IS WELLMAN-GALUSHA, BASED ON THE EXISTENCE OF A COMPREHENSIVE DATA BANK GATHERED FOR THE COMBUSTION OF CLEAN WELLMAN-GALUSHA OFF-GAS DURING A RECENTLY COMPLETED PROGRAM FOR EPA (CONTRACT NO. 68-02-1360). TWO BURNERS WERE SELECTED FOR TESTING BASED ON THEIR EXTREMELY DIFFERENT AERODYNAMIC CHARACTERISTICS AND THEIR LARGE LEVEL OF NOX EMISSIONS WITH NATURAL GAS. THE EMISSIONS FROM THE PORTED BAFFLE BURNER (PBB; USED IN MELTING, REHEATING, AND HOLDING FURNACES) IS ESTIMATED AT 92.4 X 10 TO 6 POWER LB NO2/YR WHILE THE GAS MOMENTUM CONTROL BURNER (GMCB) USED IN CEMENT, LIME, COPPER, AND ALUMINA KILNS AND DRYING FURNACES EMITS 441.0 X 10 TO 6 POWER LB NO2/YR. THESE BURNERS ARE THE TWO LARGEST POLLUTERS IN THE INDUSTRIAL CATEGORY. THEIR DIFFERENCES IN COMBUSTION AERODYNAMICS ARISE OVER THE METHOD EMPLOYED TO CONTROL THE RATE OF FUEL-AIR MIXING AND FLAME SHAPE. THE PBB USES SWIRL (TANGENTIAL VELOCITY COMPONENT) OF THE COMBUSTION AIR, WHILE THE GMCB USES THE QUANTITY AND VELOCITY OF THE PRIMARY AIR COUPLED WITH THE VELOCITY OF THE FUEL JET.

****PROJECT: 01500-SYSTEMS EVALUATION OF THE USE OF LOW SULFUR WESTERN COAL IN EXISTING SMALL AND INTERMEDIATE SIZE BOILERS**

STARTING/ COMPLETION DATE : 02/75 - 12/77 : FUNDING : ESTIMATED - FY77 / \$ 68315
 TASK CODE=F624A-024 **EPA=68-02-1863 ** (CNTR.) PRIOR FY76 / \$ 675400
 EPA OFFICER.: DG LACHAPELLE EPA/IERL - RTP
 INVESTIGATOR.: DR BARTZ K V B ENG INC
 KL MALONEY K V B ENG INC
 MILESTONES.... 02/75 -WORK INITIATED
 04/77 -INITIATE STUDY TO CORRELATE SULFUR RETENTION BY ASH
 08/77 -COMPLETE TESTING OF 10 BOILERS
 12/77 -FINAL REPORT
 PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... RECN-001500 SSIE-GMA 2156 2 EPA -68-02-1863 TASK-F624A-024
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... OBJECTIVES: DEMONSTRATE THE ENVIRONMENTALLY SOUND USE OF WESTERN COAL IN COMBUSTION SYSTEMS PRESENTLY UTILIZING BITUMINOUS COALS. EVALUATE THE EMISSIONS AND UNIT PERFORMANCE ASPECTS OF CONVERTING COMBUSTION SYSTEMS TO WESTERN COAL. PROVIDE APPLICATION GUIDELINES AND EVALUATE THE COST EFFECTIVENESS OF UTILIZING WESTERN COALS TO THEIR MAXIMUM EXTENT CONSISTENT WITH VIABILITY AND ECONOMICS. DEVELOP A CORRELATION OF SULFUR RETENTION BY ASH FOR THE COAL TESTED. APPROACH: TEN BOILERS SELECTED ON THE BASIS OF DESIGN TYPE AND SIZE WILL BE SYSTEMATICALLY TESTED WITH EACH OF TWO COAL TYPES CORRESPONDING TO THE DESIGN (EASTERN) COAL AND A WESTERN COAL. EMISSION (NOX, CO, HC AND PARTICULATES) WILL BE MEASURED. UNIT EFFICIENCY AND THE DEGREE OF CONVERTIBILITY WILL BE ASSESSED. OUTPUTS: WORK INITIATED ON FEBRUARY 14, 1975. TESTING OF 10 BOILERS COMPLETED 8/77.

****PROJECT: 01501-DESIGN OPTIMIZATION AND FIELD VERIFICATION OF AN INTEGRATED RESIDENTIAL FURNACE**

STARTING/ COMPLETION DATE : 09/76 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 350000
 TASK CODE=F624A-025 **EPA-68-02-2174 ** (CNTR.) PRIOR FY76 / \$ 141980

EPA OFFICER.: GB MARTIN EPA/IERL - RTP ADVANCED PROGRAMS
 INVESTIGATOR.: JA NESTLERODE ROCKWELL INTERNATL CORP

MILESTONES.... 09/76 -INITIATE CONTRACT
 06/77 -COMPLETE LABORATORY OPTIMIZATION
 09/78 -COMPLETE FIELD EVALUATION DOCUMENTATION

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... RECN-001501 SSIE-GMA 3107 1 EPA -68-02-2174 TASK-F624A-025
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... A 24-MONTH PROGRAM HAS BEEN INITIATED FOR DESIGN OPTIMIZATION, CONSTRUCTION, AND FIELD VERIFICATION TESTING OF A PROTOTYPE OF THE LOW-EMISSION, HIGH-PERFORMANCE RESIDENTIAL WARM-AIR-OIL FURNACE WHICH WAS DEVELOPED UNDER EPA CONTRACT 68-02-1819. THE PROGRAM WILL BE CONDUCTED IN TWO PHASES. THE FIRST PHASE WILL CONSIST OF ANALYSIS AND LABORATORY TESTING TO FURTHER OPTIMIZE THE FURNACE DESIGN AND DOCUMENT ITS POLLUTANT EMISSIONS AND THERMAL EFFICIENCY PERFORMANCE. THE OPTIMUM FURNACE'S CAPABILITIES TO OPERATE WITH ALTERNATE FUELS WILL ALSO BE EVALUATED. IN PREPARATION FOR THE NEXT PHASE, THE LOGISTICS OF FIELD TESTING RESIDENTIAL FURNACES WILL BE DELINEATED. THE SECOND PHASE WILL BE CONCERNED WITH CONSTRUCTION OF A NUMBER OF INTEGRATED FURNACE UNITS TO BE FIELD TESTED, THEIR INSTALLATION IN SELECTED RESIDENCES AND OPERATION DURING AN ENTIRE ANNUAL HEATING SEASON. THE EMISSION AND PERFORMANCE CHARACTERISTICS OF EACH TEST UNIT WILL BE DETERMINED INITIALLY AND REMEASURED MONTHLY. OPERATING CONDITIONS WILL NOT BE ADJUSTED UNLESS REQUIRED TO CORRECT AN UNSAFE OR EXCESSIVE EMISSION CONDITION. COMPLETE DESCRIPTIONS OF THE FURNACE DESIGN AND CAPABILITIES WILL BE DOCUMENTED IN A CONCISE FORM USABLE BY FURNACE MANUFACTURERS AS A DESIGN GUIDE BOOK. THE PROTOTYPE UNITS ARE BEING INSTALLED IN SIX FIELD LOCATIONS FOR TESTING OVER A HEATING SEASON.

****PROJECT: 01504-DEVELOPMENT OF CATALYST AND SYSTEM DESIGN CRITERIA FOR CATALYTIC COMBUSTORS WITH APPLICATION TO STATIONARY SOURCES**

STARTING/ COMPLETION DATE : 06/76 - 02/78 : FUNDING : ESTIMATED - FY77 / \$ 382640
 TASK CODE=F624A-027 **EPA-68-02-2116 ** (CNTR.) PRIOR FY76 / \$ 594933

EPA OFFICER.: GB MARTIN EPA/IERL - RTP
 INVESTIGATOR.: RM KENDALL ACUREX CORP AEROTHERM DIV
 CB MOYER ACUREX CORP AEROTHERM DIV
 LW ANDERSON ACUREX CORP AEROTHERM DIV
 JP KESSELRING ACUREX CORP AEROTHERM DIV
 CD HARTMAN ACUREX CORP AEROTHERM DIV
 AJ MURPHY ACUREX CORP AEROTHERM DIV

MILESTONES.... 06/76 -INITIATE CONTRACT
 10/77 -IDENTIFY PROMISING CATALYSTS
 02/78 -IDENTIFY SYSTEM DESIGN CRITERIA

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... RECN-001504 SSIE-GMA 4206 EPA -68-02-2116 TASK-F624A-027
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THIS PROGRAM IS THE ESTABLISHMENT OF DESIGN CRITERIA FOR APPLICATION OF CATALYTICAL COMBUSTION TO LOW EMISSION, HIGH EFFICIENCY STATIONARY COMBUSTION SYSTEMS. TO ACCOMPLISH THIS, A RESEARCH AND DEVELOPMENT PROGRAM CONSISTING OF EXPERIMENTAL SMALL-SCALE CATALYST AND COMBUSTOR CONCEPT SCREENING, EXPERIMENTAL AND THEORETICAL SCALE-UP WORK FOR PROMISING CONCEPTS, AND DESIGN DEVELOPMENT OF PROTOTYPE SYSTEMS BASED ON SELECTED CONCEPTS HAS BEEN OUTLINED. A NUMBER OF CATALYST SYSTEMS HAVE BEEN EVALUATED BY SMALL-SCALE SCREENING EXPERIMENTS, UNDER A VARIETY OF CONDITIONS AND FOR SEVERAL DIFFERENT FUELS. BASED ON THE RESULTS OF SINGLE-COMPONENT CATALYST SYSTEMS, ONE MULTI-COMPONENT CATALYST SYSTEM HAS BEEN DEVELOPED AND HAS BEEN TESTED EXTENSIVELY. THE MOST PROMISING SYSTEMS WILL THEN BE FURTHER TESTED BY INTEGRATION INTO A PRACTICAL COMBUSTION SYSTEM. THESE SMALL-SCALE TESTS WILL INVESTIGATE THE EFFECTS OF INTERSTAGED COOLING, MIXING OF SECONDARY AIR, AND BED HEAT REMOVAL. DATA FROM THESE TESTS WILL BE USED TO DEFINE OPTIMUM CATALYTIC SYSTEMS AND SPECIFIC EQUIPMENT APPLICATIONS, AND ALSO TO IDENTIFY THE MECHANISMS OF CATALYST PERFORMANCE BY CORRELATING THE RESULTS WITH SYSTEM PROPERTIES AND BY CONDUCTING DETAILED ANALYTICAL STUDIES WITH APPROPRIATE COMPUTING TECHNIQUES, ACCOUNTING FOR FLOW, DIFFUSION, HOMOGENEOUS AND HETEROGENEOUS REACTION EFFECTS, AND HEAT TRANSFER. LARGER-SCALE CATALYST SYSTEM AND SYSTEM CONCEPT DEVELOPMENT EXPERIMENTS WILL BE PERFORMED FOR VERIFICATION AND FURTHER DEVELOPMENT OF OPTIMUM SYSTEM, AND CONCEPTUAL DESIGNS OF PROMISING CONCEPTS WILL BE MADE.

****PROJECT: 01508-EVALUATION OF FUNDAMENTAL COMBUSTION PHENOMENA**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 60000
 TASK CODE=F624A-028 **EPA= ** (IN-HO) PRIOR FY76 / \$ 60000
 IN-HOUSE EFFORT : FY 77 / 01.1 YEARS ; TOTAL PROJECT 05.5
 EPA OFFICER.: WS LANIER EPA/IERL - RTP ORD/IERL
 INVESTIGATOR.: WS LANIER US EPA
 MILESTONES....: 10/77 -COMPLETE ASSESSMENT OF LASER DOPPLER VELOCIMETRY
 02/78 -COMPLETE INITIAL EVALUATION OF NUMERICAL TECHNIQUES FOR SOLUTION
 00/00 -PERFORM VARIOUS STUDIES RELATED TO FUNDAMENTAL COMBUSTION RESEARC
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001506 SSIE-ZMA 1133 TASK-F624A-028 AP -624A
 DU -L110 LABT-EMI
 ABSTRACT.....: THE RESEARCH ACTIVITIES BEING PURSUED UNDER THIS EPA IN-HOUSE PROGRAM FALL INTO TWO CATEGORIES: 1) COMBUSTION AERODYNAMICS AND 2) CHEMICAL KINETICS. IN THE COMBUSTION AERODYNAMICS CATEGORY, STUDIES ARE UNDERWAY TO DEFINE THE INFLUENCE OF EXTERNAL COMBUSTOR AND BURNER VARIABLES ON THE FLOW FIELD STRUCTURE. SPECIFICALLY, A LASER DOPPLER VELOCIMETER IS BEING USED TO MAP THE VELOCITY AND TURBULENCE FIELD IN A SIMULATED FURNACE. EXTERNAL VARIABLES BEING INVESTIGATED ARE THE BURNER CONFINEMENT RATIO, AIR SWIRL LEVEL, INLET QUARL ANGLE AND INLET AIR VELOCITY LEVEL. THE DATA SO GENERATED WILL BE COMPARED TO PREDICTED VALUES FROM APPROPRIATE COMPUTER PROGRAMS. IN THE CHEMICAL KINETICS CATEGORY, PRIMARY ACTIVITY CENTERS AROUND THE USE OF COMPUTER CODES TO ANALYZE KINETIC DATA AND TO DEFINE THE MECHANISMS FOR THE FORMATION OF NO.

****PROJECT: 01509-DIRECT MEASUREMENT OF COMBUSTION FACTOR EFFECTS ON SECONDARY PARTICULATE FORMATION**

STARTING/ COMPLETION DATE : 03/77 - 12/77 : FUNDING : ESTIMATED - FY77 / \$ 47227
 TASK CODE=F624A-030 **EPA= ** (IN-HO) PRIOR FY /
 IN-HOUSE EFFORT : FY 77 / 00.6 YEARS ; TOTAL PROJECT 02.5
 EPA OFFICER.: WS LANIER EPA/IERL - RTP ORD/IERL
 INVESTIGATOR.: WS LANIER US EPA
 B DEMITRIADES US EPA ORD/IERL
 MILESTONES....: 03/77 -ISSUE GRANT FOR SMOG CHAMBER CONSTRUCTION
 06/77 -INITIATE BASELINE CHARACTERIZATION OF BOILER
 08/77 -INITIATE BOILER/CHAMBER STUDIES
 12/77 -COMPLETE INITIAL ASSESSMENT
 02/78 -ISSUE FINAL REPORT
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001509 SSIE-ZMA 1132 TASK-F624A-030 AP -624A
 DU -L110 LABT-EMI
 ABSTRACT.....: THE PROPOSED EFFORT HAS AS ITS OBJECTIVE DETERMINATION OF THE EXTENT TO WHICH MODIFICATIONS IN BASIC COMBUSTION PROCESS AND FUEL CONSTITUENTS WILL AFFECT THE PRIMARY EMISSIONS OF SULFATES AND OTHER PARTICULATES AND THE EXTENT TO WHICH SUCH VARIABLES WILL AFFECT ATMOSPHERIC FORMATION OF PARTICULATES. THE BASIC TECHNIQUE BEING DEVELOPED AND EMPLOYED IS THE COUPLING OF AN ATMOSPHERIC REACTION CHAMBER TO A LABORATORY BOILER. DETAILED BOILER EXHAUST MEASUREMENTS WILL BE PERFORMED AND THE PROGRESSION OF THE PHOTOCHEMICAL CONVERSION OF THESE EMISSIONS TO ATMOSPHERIC PARTICULATES (SUCH AS SULFATES AND NITRATES) WILL BE MONITORED IN THE SMOG CHAMBERS. CONDITIONS TO BE VARIED INITIALLY INCLUDE COMBUSTION MODIFICATIONS, FUEL SULFUR LEVEL AND FULL TRACE METAL SPECIATION AND QUANTITY. TO DATE THE BOILER HAS BEEN BASE LINED, AND THE ATMOSPHERIC REACTION CHAMBER CONSTRUCTED. ACTUAL TESTING WILL COMMENCE IN MID TO LATE AUGUST, 1979.

****PROJECT: 01510-CHARACTERIZATION OF EMISSION AND COMBUSTION PERFORMANCE OF ALTERNATE FUELS**

STARTING/ COMPLETION DATE : 06/71 - UNK : FUNDING : ESTIMATED - FY77 / \$ 60000
 TASK CODE=F624A-031 **EPA= ** (IN-HO) PRIOR FY76 / \$ 60000
 IN-HOUSE EFFORT : FY 77 / 01.0 YEARS ; TOTAL PROJECT 10.0
 EPA OFFICER.: GB MARTIN EPA/IERL - RTP ORD/IERL
 INVESTIGATOR.: GB MARTIN US EPA
 N BUTTS US EPA ORD/IERL
 MILESTONES....: 06/74 -INITIATE STUDY OF ALTERNATE FUELS
 10/75 -COMPLETE STUDY OF ALCOHOL FUELS
 02/79 -COMPLETE STUDY OF LOW BTU GAS COMBUSTORS
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001510 SSIE-ZMA 1134 TASK-F624A-031 AP -624A
 DU -L110 LABT-EMI
 ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO EVALUATE EMISSION PERFORMANCE OF ALTERNATE FUELS AND ADVANCED CONCEPT CONTROL TECHNIQUES. THIS EVALUATION PROVIDES AN INITIAL ASSESSMENT OF PROBLEMS AND/OR PROMISE OF DIFFERENT TECHNOLOGY APPROACHES. THE STUDY UTILIZES A 300,000 BTU/HR VERSATILE EXPERIMENTAL FURNACE FOR COMPARISON OF ALTERNATE FUEL PERFORMANCE TO PREVIOUSLY ESTABLISHED BASE LINES FOR CONVENTIONAL FUEL. THE BASIC FURNACE ALLOWS FOR BURNER DESIGN CHANGES AS WELL AS STAGED COMBUSTION AND FLUE GAS RECIRCULATION. TO DATE THE PROJECT HAS EVALUATED: (1) FUEL NITROGEN CONVERSION AND CONTROL TECHNIQUES FOR LIQUID FUELS; AND (2) ALCOHOL FUELS. A FUEL GAS GENERATOR SYSTEM CAPABLE OF PRODUCING SIMULATED LOW BTU GASES WITH VARIABLE CO TO H2 RATIOS, CH4 CONTENT AND NH3 CONTENT AT A RANGE OF TEMPERATURES FROM 250 DEGREES F TO 1,350 DEGREES F IS BEING DELIVERED. THE EFFORT WILL CENTER ON CONCEPTS FOR CONTROL FUEL AND THERMAL NOX.

****PROJECT: 01512-CHARACTERIZATION AND DESIGN EVALUATION FOR COMMERCIAL COMBUSTION SYSTEMS**

STARTING/ COMPLETION DATE : 05/74 - 09/81 : FUNDING : ESTIMATED - FY77 / \$ 60000
 TASK CODE=F624A-032 **EPA= ** (IN-HO) PRIOR FY76 / \$ 110000
 IN-HOUSE EFFORT : FY 77 / 01.1 YEARS : TOTAL PROJECT 05.5
 EPA OFFICER.: RE HALL EPA/IERL - RTP
 INVESTIGATOR.: RE HALL US EPA
 GR GILLIS US EPA
 MILESTONES....: 01/74 -PUBLICATION OF REPORT ON EPA IN-HOUSE RESIDENTIAL HEATER STUDY
 06/74 -PREPARATION OF APCA PAPER ON EPA'S RESIDENTIAL HEATER PROGRAM
 10/74 -EVALUATION OF COMPAGNIE FRANCAISE DE RAFFINAGE WATER/OIL EMULSIFI
 12/74 -EVALUATION OF COTTELL REACTOR WATER/OIL EMULSIFIER
 06/75 -PREPARATION OF APCA PAPER ON WATER/DISTILLATE OIL EMULSIFIERS
 08/75 -EVALUATION OF BLUE RAY BURNER
 12/75 -PREPARATION OF ASME PAPER ON WATER/RESIDUAL OIL EMULSIONS
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001512 SSIE-ZMA 1131 TASK-F624A-032 AP -624A
 DU -L110 LABT-EMI

ABSTRACT.....: THIS IN-HOUSE PROJECT IS DESIGNED TO PROVIDE THE CAPABILITY FOR FAST RESPONSE TESTING OF
 COMMERCIALLY AVAILABLE AND PROTOTYPE COMBUSTION EQUIPMENT AND COMBUSTION IMPROVING DEVICES.
 MEASUREMENTS INCLUDE OXIDES OF NITROGEN, OXIDES OF SULFUR, CARBON MONOXIDE, HYDROCARBONS, OXYGEN,
 CARBON DIOXIDE, SMOKE, AND PARTICULATES (MASS AND SIZE DISTRIBUTION). IN SOME TESTS TRACE SPECIES
 AND EFFICIENCY MEASUREMENTS ARE MADE. TEST EQUIPMENT INCLUDES A RESIDENTIAL WARM-AIR FURNACE RATED
 AT 100,000 BTU/HR, A SCOTCH MARINE PACKAGE FIRETUBE BOILER RATED AT 2,400,000 BTU/HR, AND A FIREBOX
 FIRETUBE PACKAGE BOILER RATED AT 1,440,000 BTU/HR. VARIOUS BURNER DESIGNS ARE TESTED IN THESE
 UNITS. FUELS INCLUDE NATURAL GAS, DISTILLATE OIL, AND LOW SULFUR RESIDENTIAL OIL. EXPECTED OUTPUTS
 INCLUDE EVALUATIONS OF WATER-IN-OIL EMULSIONS, PROTOTYPE OR COMMERCIALLY AVAILABLE PACKAGED BOILER
 BURNERS, AND PROTOTYPE OR COMMERCIALLY AVAILABLE RESIDENTIAL BURNERS.

****PROJECT: 01518-POTENTIAL BENEFICIAL USE OF INDUSTRIAL WASTE HEAT FOR GREENHOUSE
 PRODUCTION OF BEDDING PLANTS, CUT FLOWERS AND FOLIAGE PLANTS**

STARTING/ COMPLETION DATE : 08/77 - 08/78 : FUNDING : ESTIMATED - FY77 / \$ 60000
 TASK CODE=F624A-039 **EPA=R804499 ** (GRANT) PRIOR FY76 / \$ 40000
 EPA OFFICER.: TG BRNA EPA/IERL - RTP
 INVESTIGATOR.: IJ CRUMBLY FORT VALLEY STATE COLL
 OW ROBINSON FORT VALLEY STATE COLL
 B ADAMS FORT VALLEY STATE COLL
 J KENNEBREW FORT VALLEY STATE COLL
 MILESTONES....: 08/77 -LABORATORY STUDIES COMPLETED
 09/77 -GREENHOUSES CONSTRUCTED
 08/77 -FINAL REPORT COMPLETED
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001518 SSIE-GMA 4139 EPA -R804499 TASK-F624A-039
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES: THE FEASIBILITY OF USING INDUSTRIAL WASTE HEAT TO CONTROL THE ENVIRONMENT OF GREENHOUSES
 WILL BE EVALUATED RELATIVE TO THREE MAJOR OVERALL OBJECTIVES: A. TESTING THE CAPABILITIES OF THE
 ENVIRONMENTAL CONTROL SYSTEM; B. DETERMINING THE EFFECTS OF THE GREENHOUSE ENVIRONMENTS ON THE
 PRODUCTION OF ORNAMENTAL AND VEGETABLE BEDDING PLANTS, CUT-FLOWERS, AND FOLIAGE PLANTS, AND C.
 EVALUATING THE OVERALL ECONOMICS OF THE SYSTEM. APPROACH: TWO PLASTIC GREENHOUSES, 27' X 72'
 QUONSET-TYPE, WILL BE USED; ONE WILL SERVE AS THE CONTROL AND THE OTHER AS THE WASTE HEAT RESEARCH
 GREENHOUSE. CONVENTIONAL ENVIRONMENTAL CONTROL WILL BE USED IN THE CONTROL GREENHOUSE WHILE BOTH
 HEATING AND COOLING OF THE RESEARCH GREENHOUSE WILL EMPLOY AIR DRAWN THROUGH A CEL-DEK PAD. HEATING
 WILL BE EFFECTED BY PASSING AIR THROUGH THE CEL-DEK PAD CONTAINING COOLING WATER HEATED BY A BOILER
 PRIOR TO DISTRIBUTING THE AIR IN THE RESEARCH GREENHOUSE. COOLING WILL BE EFFECTED BY REVERSING THE
 AIR FLOW DIRECTION. ORNAMENTAL AND CUT-FLOWER, FOLIAGE PLANT, AND VEGETABLE SPECIES, WHICH WERE
 SELECTED IN EARLIER STUDIES WILL BE GROWN IN THE YEAR-LONG GREENHOUSE PRODUCTION PHASE OF THE
 STUDY. ECONOMIC STUDIES WILL BE MADE FOR EACH CROP TO ASSESS CUSTOMER ACCEPTANCE AND PRODUCTION
 COSTS. OUTPUTS: THE FINAL REPORT FOR THE PROJECT WILL PROVIDE DATA, METHODS, AND RESULTS RELATIVE
 TO THE HORTICULTURAL, ENGINEERING AND ECONOMIC OBJECTIVES OF THE STUDY.

****PROJECT: 01519-WET/DRY COOLING TOWER STUDY**

STARTING/ COMPLETION DATE : 06/75 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 6000
 TASK CODE=F624A-040 **EPA=68-03-2202 ** (CNTR.) PRIOR FY75 / \$ 159970

EPA OFFICER.: TG BRNA EPA/IERL - RTP
 INVESTIGATOR.: GA ENGLESON UNITED ENG & CONST INC ADVANCED ENG
 MC HU UNITED ENG & CONST INC ADVANCED ENG

MILESTONES....: 12/76 -DRAFT REPORT SUBMITTED TO EPA FOR REVIEW
 10/77 -FINAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001519 SSIE-GMA 4160 EPA -68-03-2202 TASK-F624A-040
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES: THE OBJECTIVE OF THE PROPOSED WORK IS TO EVALUATE THE TECHNICAL AND ECONOMIC FEASIBILITY OF WET/DRY COOLING TOWERS AT SPECIFIC SITES FOR THE PURPOSE OF WATER CONSERVATION AND/OR PLUME ABATEMENT. APPROACH: AN OPTIMIZATION TECHNIQUE WILL BE USED SUCH THAT THE WET/DRY TOWERS WOULD HAVE OPTIMUM DRY AND WET PORPORTIONS WITH RESPECT TO CAPITAL COST AND OPERATIONAL PENALTIES PLUS QUANTITY OF MAKE-UP WATER OF FOGGING IMPACT. CURRENT PLANS: THE PROGRAM IS CONCEIVED AS CONSISTING OF A SET OF SIX TASKS. THE FIRST IS TO LAY GROUNDWORK AND TO ACCUMULATE DATA FOR THIS STUDY. THE NEXT THREE FOR WATER CONSERVATION IN THE COAL-RICH REGION IN THE WESTERN UNITED STATES. FOR THESE THREE TASKS, THE WET-DRY TOWERS WILL BE INTERFACED WITH A 1, 00-MWE COAL-FIRED FOSSIL PLANT. THE LAST TWO TASKS ARE FOR PLUME ABATEMENT PURPOSE IN URBAN AREAS OF THE CONTERMINOUS UNITED STATES. FOR THE LAST TWO TASKS, THE WET/DRY TOWERS TO BE EVALUATED WILL BE INTERFACED WITH BOTH A 100-MWE FOSSIL PLANT AND A 1,000-MWE NUCLEAR PLANT. THE STUDY IS SCHEDULED TO BE COMPLETED IN JUNE, 1976. OUTPUTS: A COMPREHENSIVE REPORT WILL DOCUMENT THE METHODS AND RESULTS OF THIS STUDY. THE REPORT WILL CONTAIN GRAPHS AND TABLES RELATING OPTIMIZED WET/DRY COOLING SYSTEMS AND THE REFERENCE SYSTEM IN TERMS OF COSTS AND WET/DRY COOLING SYSTEM FOR PLUME ABATEMENT AT REPRESENTATIVE U. S. SITES.

****PROJECT: 01520-DISPOSAL OF BYPRODUCTS FROM NONREGENERABLE FLUE GAS DESULFURIZATION SYSTEMS**

STARTING/ COMPLETION DATE : 03/77 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 3440
 TASK CODE=F624A-041 **EPA=68-02-2633 ** (CNTR.) PRIOR FY76 / \$ 220000

EPA OFFICER.: JW JONES EPA/IERL - RTP
 INVESTIGATOR.: J ROSSOFF AEROSPACE CORP ELECTRONICS RES LAB

MILESTONES....: 06/78 -FINAL REPORT ISSUED

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001520 SSIE-GMA 4168 EPA -68-02-2633 TASK-F624A-041
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES: EVALUATE TECHNIQUES FOR THE ENVIRONMENTALLY SOUND DISPOSAL OF WASTES FROM POWER PLANT NONREGENERABLE FLUE GAS DESULFURIZATION SYSTEMS. APPROACH: WASTES OBTAINED FROM PROTOTYPE SCRUBBERS AT THE TVA SHAWNEE POWER STATION AT PADUCAH, KENTUCKY HAVE BEEN PLACED IN SEVEN PONDS NEARBY. TWO PONDS CONTAIN UNTREATED WASTE (ONE WITH LIMESTONE WASTE AND ONE WITH LIME), THREE PONDS CONTAIN CHEMICALLY TREATED WASTE (TWO LIMESTONE AND ONE LIME), AND TWO PONDS CONTAIN UNTREATED WASTE WITH AN UNDERDRAIN (ONE LIME AND ONE LIMESTONE). AN ADDITIONAL POND IS SCHEDULED TO BE FILLED WITH OXIDIZED SULFITE WASTE LATER IN 1977. THROUGH PERIODIC SAMPLING AND ANALYSIS OF WATER, SOIL AND SLUDGE MATERIALS, AN ASSESSMENT IS BEING MADE OF CURRENT DISPOSAL TECHNOLOGY. ENGINEERING COST ESTIMATES FOR THE ALTERNATIVE APPROACHES ARE ALSO BEING DEVELOPED. PLANS: THE PROJECT WAS INITIATED IN SEPTEMBER, 1974 AND IS SCHEDULED TO CONTINUE THROUGH MARCH, 1978.

****PROJECT: 01522-AN ASSESSMENT OF THE TECHNOLOGY OF DISPOSAL AND UTILIZATION OF FLUE GAS CLEANING BYPRODUCTS**

STARTING/ COMPLETION DATE : 09/77 - 09/81 : FUNDING : ESTIMATED - FY77 / \$ 70000
 TASK CODE=F624A-042 **EPA=68-02-2654 ** (CNTR.) PRIOR FY76 / \$ 720000

EPA OFFICER.: JW JONES EPA/IERL - RTP
 INVESTIGATOR.: CJ SANTHANUM ARTHUR D. LITTLE INC
 SL JOHNSON ARTHUR D. LITTLE INC
 RR LUNT ARTHUR D. LITTLE INC
 JE OBERHOLTZER ARTHUR D. LITTLE INC

MILESTONES....: 12/78 -ANNUAL REPORT ISSUED
 12/79 -ANNUAL REPORT ISSUED
 12/80 -ANNUAL REPORT ISSUED
 12/81 -FINAL REPORT ISSUED

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001522 SSIE-GMA 4154 EPA -68-02-2654 TASK-F624A-042
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES: COMPILE AND ASSESS DATA AND INFORMATION REGARDING RESEARCH AND DEVELOPMENT RESULTS AND COMMERCIAL ACTIVITIES IN THE AREA OF DISPOSAL/UTILIZATION OF FLUE GAS CLEANING BYPRODUCTS, WITH EMPHASIS ON ENVIRONMENTAL ACCEPTABILITY AND COSTS; REPORT RESULTS ANNUALLY. APPROACH: CONTRACTOR WILL COMPILE AND ASSESS DATA AND INFORMATION FROM RESEARCH AND DEVELOPMENT ACTIVITIES CONDUCTED BY EPA, TVA, AND PRIVATE CONCERNS TO DETERMINE THE STATE-OF-THE-ART OF DISPOSAL AND UTILIZATION OF FLUE GAS CLEANING BYPRODUCTS. THIS ASSESSMENT WILL INCLUDE AN EVALUATION OF POTENTIAL ENVIRONMENTAL EFFECTS OF VARIOUS TECHNOLOGIES AND A CRITICAL REVIEW OF THEIR ECONOMICS. PHYSICAL AND CHEMICAL CHARACTERIZATION OF FLUE GAS CLEANING WASTES FROM SEVERAL PLANTS WILL BE CONDUCTED. RESULTS OF THIS EFFORT WILL BE REPORTED ANNUALLY, AND WILL INCLUDE RECOMMENDATIONS FOR APPLIED RESEARCH AND DEVELOPMENT EFFORTS. CURRENT PLANS: CONTRACT JUST UNDERWAY.

****PROJECT: 01523-WET/DRY COOLING TOWER TEST MODULE PROGRAM**

STARTING/ COMPLETION DATE : 08/77 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=F624A-043 **EPA=R805220 ** (GRANT) PRIOR FY /

EPA OFFICER.: TG BRNA
 INVESTIGATOR.: WC MARTIN
 TP FITZPATRICK
 SOUTHERN CALIFORNIA EDISON CO
 SOUTHERN CALIFORNIA EDISON CO

MILESTONES.... 09/77 -COMPLETION OF CONSTRUCTION OF COOLING TOWER TEST MODULE
 10/77 -START OF COOLING TOWER TEST PROGRAM
 10/78 -COMPLETION OF COOLING TOWER TEST PROGRAM
 04/79 -PUBLICATION OF FINAL REPORT FOR WET/DRY COOLING TEST MODULE PROGR AM

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... RECN-001523 SSIE-GMA 4135 EPA -R805220 TASK-F624A-043
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... OBJECTIVES: IN THIS MULTI-SPONSORED PROJECT, THE PROGRAM OBJECTIVES ARE: A. TO DETERMINE THE WATER CONSERVATION AND OPERATIONAL CHARACTERISTICS OF THE WET/DRY COOLING TOWER TEST MODULE IN AN ELECTRICAL POWER PLANT SITUATION, AND B. TO DEVELOP AND CONFIRM A MATHEMATICAL MODEL FOR ACCURATELY DESCRIBING AND PREDICTING THE PERFORMANCE OF THE WET/DRY COOLING SYSTEM. APPROACH: A FULL-SIZE WET/DRY COOLING TOWER CELL WILL BE INSTALLED AND TESTED AT A PLANT SITE OVER A ONE-YEAR PERIOD. TEST DATA WILL BE USED TO CONFIRM THE MATHEMATICAL MODEL. OUTPUTS: TEST MODULE, COOLING SYSTEM AND AMBIENT DATA WILL BE COLLECTED DURING THE TESTING PHASE WHICH IS SCHEDULED FOR COMPLETION IN OCTOBER 1978. THESE DATA WILL BE INCLUDED IN THE COMPREHENSIVE REPORT FOR THE TEST PROGRAM, THE REPORT TO BE COMPLETED IN APRIL 1979.

****PROJECT: 01524-LIME/LIMESTONE SCRUBBING WASTE CONVERSION PILOT STUDY**

STARTING/ COMPLETION DATE : 08/77 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 81600
 TASK CODE=F624A-044 **EPA=68-02-2644 ** (CNTR.) PRIOR FY76 / \$ 292400

EPA OFFICER.: JW JONES
 INVESTIGATOR.: AG SLIGER
 BG MANDELIK
 M.W. KELLOGG CO
 M.W. KELLOGG CO

MILESTONES.... 01/78 -COMPLETE LIMESTONE SCRUBBING WASTE REDUCTION TO SULFIDE; ISSUE IN
 04/78 -COMPLETE CARBONATION PILOT PLANT CONSTRUCTION
 06/78 -COMPLETE CARBONATION TESTS
 09/78 -ISSUE FINAL REPORT ON PROJECT

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... RECN-001524 SSIE-GMA 4153 EPA -68-02-2644 TASK-F624A-044
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... OBJECTIVES: DEVELOP KEY PROCESS STEPS, ON A PILOT SCALE, IN THE PULLMAN KELLOGG "KEL-S" PROCESS FOR CONVERSION OF LIME/LIMESTONE SCRUBBING WASTE TO ELEMENTAL SULFUR AND CALCIUM CARBONATE. APPROACH: WASTE FROM A LIMESTONE SCRUBBER WILL BE REDUCED TO CALCIUM SULFIDE IN A REDUCTION KILN. THE REDUCED PRODUCT WILL BE SLURRIED THEN CARBONATED IN A STIRRED REACTOR, RELEASING HYDROGEN SULFIDE GAS (WHICH CAN BE READILY CONVERTED TO SULFUR). THE SOLID REACTION PRODUCTS WILL CONSIST OF CALCIUM CARBONATE AND INERTS (E.G., COAL ASH); THE INERTS WILL BE SEPARATED FROM THE CALCIUM CARBONATE BY AIR FLOTATION. DESIGN DATA FROM THESE PILOT TESTS SHOULD BE SUFFICIENT FOR SCALE-UP TO A LARGE (PROTOTYPE) TEST UNIT. CURRENT PLANS: THE PROJECT WAS INITIATED 8/22/77. LIMESTONE SCRUBBING WASTE WILL BE SHIPPED TO THE REDUCTION KILN SITE IN SEPTEMBER, 1977.

****PROJECT: 01529-DEWATERING PRINCIPLES AND EQUIPMENT DESIGN STUDIES**

STARTING/ COMPLETION DATE : 06/76 - 08/78 : FUNDING : ESTIMATED - FY77 / \$ 75000
 TASK CODE=F624A-047 **EPA=R804531 ** (GRANT) PRIOR FY76 / \$ 75000

EPA OFFICER.: JW JONES
 INVESTIGATOR.: AR TARRER
 BH SHAH
 JC WARMAN
 AUBURN UNIV
 AUBURN UNIV
 AUBURN UNIV

MILESTONES.... 08/78 -ISSUE FINAL REPORT
 PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... RECN-001529 SSIE-GMA 2843 I EPA -R804531 TASK-F624A-047
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... OBJECTIVES: DEVELOP MORE ECONOMICALLY FEASIBLE METHODS THAN THOSE CURRENTLY AVAILABLE FOR CONTINUOUS TREATMENT OF FLUE GAS CLEANING (FGC) WASTES. INITIAL EFFORTS ARE TO BE CONCENTRATED ON APPLYING GRAVITY SEDIMENTATION TO RAPIDLY, INEXPENSIVELY DEWATER FGC WASTES. APPROACH: DEVELOP METHODS FOR CHARACTERIZING THE PHYSICAL PROPERTIES AND BEHAVIOR OF FGC WASTES. DEVELOP PROCEDURES BASED ON THE MODELS PRESENTED HEREIN TO ALLOW ACCURATE DESIGN AND ANALYSIS OF GRAVITY SEDIMENTATION UNITS USED IN TREATING FGC WASTES. PERFORM BENCH SCALE AND PILOT TESTS TO EVALUATE THE FEASIBILITY OF USING GRAVITY SEDIMENTATION UNITS FOR TREATING FGC WASTES. PERFORM DEVELOPMENTAL STUDIES TO DETERMINE THE BEST DESIGN FOR CHANNEL PROMOTERS. BENCH SCALE AND CONTINUOUS PILOT TESTS ARE TO BE PERFORMED TO EVALUATE THE FEASIBILITY OF SUCH DEVICES FOR IMPROVING DEWATERING EFFICIENCY WHILE TREATING FGC WASTES. ASSESS FILTERABILITY OF DIFFERENT TYPES OF FGC SLUDGES DEWATERED TO DIFFERENT DEGREES AND PUMPING REQUIREMENTS FOR THE DIFFERENT SLUDGES. PROGRESS: A GRAVITY SEDIMENTATION SYSTEM CAN NOW BE PROPOSED WHICH SHOULD ALLOW RAPID DEWATERING OF FGC WASTE TO HIGH CONCENTRATIONS (35 TO 50 PERCENT SOLIDS) WITHOUT THE NEED FOR CHEMICAL ADDITIVES (FLOCCULANTS). THIS SYSTEM SEPARATES THE CLARIFICATION AND THICKENING FUNCTIONS INTO TWO UNITS WHICH ARE MUCH SMALLER AND LESS EXPENSIVE THAN CONVENTIONAL DEWATERING EQUIPMENT. FURTHER DEVELOPMENT OF THIS CONCEPT IS UNDERWAY.

****PROJECT: 01530-DISPOSAL OF HIGH ALKALINE FLY ASH SLUDGE IN A DECOALED MINE SEAM**

STARTING/ COMPLETION DATE : 09/77 - 08/79 : FUNDING : ESTIMATED - FY77 / \$ 236000
 TASK CODE=F624A-048 **EPA=R805459 ** (GRANT) PRIOR FY /

EPA OFFICER.: JW JONES
 INVESTIGATOR.: DE MANZ
 GH GROENEWOLD
 Y HUNG
 UNIVERSITY OF NORTH DAKOTA
 STATE GEOLOGICAL SURVEY
 UNIVERSITY OF NORTH DAKOTA

MILESTONES....: 09/78 -ISSUE INTERIM REPORT
 09/79 -ISSUE FINAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION

ORDIS CODES...: RECN-001530 SSIE-GMA 4136 EPA -R805459 TASK-F624A-048
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES: DETERMINE THE ENVIRONMENTAL EFFECTS OF SLUDGE DISPOSAL FROM A LIGNITE FLY ASH SO2 SCRUBBER (AT THE MILTON R. YOUNG POWER STATION, CENTER, NORTH DAKOTA) IN A DECOALED OPEN PIT MINE. MONITOR THE GROUNDWATER AND LEACHATE IN THE PROXIMITY OF THE BURIED SLUDGE, AS WELL AS AN EXPOSED SURFACE SLUDGE POND. INVESTIGATE THE PROPERTIES OF SLUDGE, ASH AND SOIL. ASSESS THE STABILITY OF MINE SPOIL DEPOSITED OVER THE SLUDGE. APPROACH: (1) STUDY AVAILABLE MINE, SLUDGE, AND SLUDGE DISPOSAL CHARACTERIZATIONS FROM A 3-YEAR MINING PLAN AND LABORATORY ANALYSES OF PILOT PLANT SLUDGE; (2) CONDUCT ADDITIONAL SLUDGE AND MINE CHARACTERIZATION; (3) CONDUCT EXTENSIVE SAMPLING AND TESTING PRIOR TO AND SUBSEQUENT TO: (A) CONSTRUCTION OF AN EXPOSED SURFACE SLUDGE POND, AND (B) INSTALLATION OF SEVERAL GROUNDWATER AND LEACHATE WELLS IN PROXIMITY OF BURIED SLUDGE IN THE DECOALED MINE SEAM AND SLUDGE POND. ANALYSES OF GROUNDWATER, LEACHATE, SUPERNATANT, SLUDGE AND SOIL FOR 15 MONTH PERIOD; (4) OBTAIN AND COMPIL COST INFORMATION FROM THE POWER PLANT FOR INCLUSION IN AN ECONOMY STUDY BY ARTHUR D. LITTLE, INC. OF DISPOSAL OF SLUDGE IN DECOALED MINE SEAM; (5) ASSESS THE DATA AND PREPARE THE FINAL REPORT, TO BE INCORPORATED IN AN ARTHUR D. LITTLE REPORT FOR CONTRACT 68-03-2334. CURRENT PLANS: PROJECT JUST INITIATED.

****PROJECT: 01531-DEVELOPMENT OF ENVIRONMENTAL ASSESSMENT AND CONTROL TECHNOLOGY QUALITY ASSURANCE PROGRAMS**

STARTING/ COMPLETION DATE : 05/76 - 05/79 : FUNDING : ESTIMATED - FY77 / \$ 225000
 TASK CODE=F624A-049 **EPA=68-02-2156 ** (CNTR.) PRIOR FY76 / \$ 505000

EPA OFFICER.: WB KUYKENDAL
 INVESTIGATOR.: CE DECKER
 F SMITH
 J BUCHANAN
 D WAGONER
 EPA/IERL - RTP
 RESEARCH TRIANGLE INST
 RESEARCH TRIANGLE INST
 RESEARCH TRIANGLE INST
 RESEARCH TRIANGLE INST

MILESTONES....: 03/76 -QA PLAN FOR DEMONSTRATION PROJECTS
 09/77 -QA PLAN FOR ENVIRONMENTAL ASSESSMENT PROJECTS
 11/77 -QA PLAN FOR FIELD STUDIES
 02/78 -QA PLAN FOR PILOT PROGRAMS
 05/78 -QA PLAN FOR RESEARCH AND BENCH-SCALE PROJECTS
 09/78 -QA PLAN FOR INDUSTRY SYSTEM STUDIES/POLLUTANT SYSTEM STUDIES

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001531 SSIE-GMA 4171 EPA -68-02-2156 TASK-F624A-049
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVE: THE ENVIRONMENTAL PROTECTION AGENCY IN ITS ENERGY AND INDUSTRIAL PROCESSES PROGRAMS IS INVOLVED IN NUMEROUS AND VARIED ENVIRONMENTAL ASSESSMENT AND TECHNOLOGY DEVELOPMENT PROJECTS. THE OBJECTIVE OF THIS PROJECT IS TO DEVELOP, EVALUATE, ADAPT AND PROVIDE GUIDELINES, FOR THE APPLICATION OF QUALITY CONTROL AND ASSURANCE PRACTICES AND PROCEDURES TO VARIOUS MEASUREMENT SYSTEMS, DEVICES, AND PROCEDURES UTILIZED IN THE ABOVE PROJECTS. APPROACH: THE TEAM USED ON THIS CONTRACT HAS FORMAL TRAINING IN CHEMISTRY, CHEMICAL ENGINEERING, ELECTRICAL ENGINEERING, AND STATISTICS WITH EXPERIENCE IN SAMPLING AND ANALYZING MATERIALS IN STATIONARY SOURCE PROCESSES, CONTROL DEVICES, AND EFFLUENT STREAMS. A SYSTEMS APPROACH WILL BE UTILIZED IN DEVELOPING QUALITY ASSURANCE PLANS CONSISTING OF AN OPTIMUM MIX OF TECHNOLOGIES SUCH AS MATERIAL BALANCES, INTERRELATION OF PROCESS ENGINEERING DATA AND CONTROL SYSTEM PARAMETER VALUES WITH EFFLUENT STREAM MEASUREMENTS, MAINTENANCE OF QUALITY CONTROL CHARTS AND OTHER STATISTICAL TECHNIQUES, AND QUANTITATIVE PERFORMANCE AUDITS TO YIELD THE MAXIMUM QUALITY ASSURANCE AT THE MINIMUM COST. THE BASIC PLAN IS TO PREPARE GENERAL QC/QA PLANS FOR A PROJECT TYPE, THEN EVALUATE THE PLAN BY SHORT TERM IMPLEMENTATION AT SELECTED IERL/RTP PROJECT SITES. AFTER FIELD EVALUATION A QC/QA SPECIFIC TO THE PROJECT IS PREPARED. A QA PLAN SPECIFIC TO THE DEMONSTRATION SCALE PROJECTS HAS BEEN PREPARED. OUTPUT: TWO QUALITY ASSURANCE PLANS HAVE BEEN DEVELOPED FOR DEMONSTRATION PROJECTS AND ENVIRONMENTAL ASSESSMENT PROJECTS. IMPLEMENTATION OF THE QUALITY ASSURANCE PLAN IS UNDERWAY FOR THESE TWO CLASSES OF PROJEC

****PROJECT: 01538-STANDARDIZATION OF OPERATING PERFORMANCE OF A DROPLET MEASURING DEVICE**

STARTING/ COMPLETION DATE : 05/77 - 11/79 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=F624A-052 **EPA=68-02-2111 ** (CNTR.) PRIOR FY76 / \$ 158650

EPA OFFICER.: DB HARRIS
 INVESTIGATOR.: H MEDICKI
 D MAGNUS
 EPA/IERL - RTP
 K L D ASSOCIATES INC
 K L D ASSOCIATES INC

MILESTONES....: 01/76 -DESIGN, CONSTRUCT AND DELIVER IMPROVED DROPLET SIZING DEVICE
 03/77 -DEVELOP MULTIPLE PROBE INTERFACE
 11/77 -COMPARISON OF HOT WIRE AND IMPACTOR TECHNIQUES REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001536 SSIE-GMA 4156 EPA -68-02-2111 TASK-F624A-052
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVE: THIS STUDY IS TO COMPARE THE PRESENTLY USED CASCADE IMPACTOR WITH THE NEWLY DEVELOPED HOT WIRE DROPLET SIZER. APPROACH: LABORATORY AND FIELD TESTS WILL BE CONDUCTED SIMULTANEOUSLY. DISCREPANCIES WILL BE INVESTIGATED AND A REPORT OF THE RESULTS PREPARED. OUTPUTS: LABORATORY TESTING USING A CLOSED SYSTEM HAS BEEN SUCCESSFULLY TESTED. A FIELD TEST PROGRAM HAS BEEN DESIGNED.

****PROJECT: 01537-THE DEVELOPMENT OF FUGITIVE EMISSIONS SAMPLING TECHNIQUES**

STARTING/ COMPLETION DATE : 11/75 - 11/78 : FUNDING : ESTIMATED - FY77 / \$ 233075
 TASK CODE=F624A-053 **EPA-68-02-2133 ** (CNTR.) PRIOR FY76 / \$ 369600

EPA OFFICER.: DB HARRIS EPA/IERL - RTP
 INVESTIGATOR.: HJ KOLNSBERG RESEARCH CORP. OF NEW ENGLAND
 JE YOCOM RESEARCH CORP. OF NEW ENGLAND
 PW KALIKA RESEARCH CORP. OF NEW ENGLAND
 RE KENSON RESEARCH CORP. OF NEW ENGLAND
 PT BARTLETT RESEARCH CORP. OF NEW ENGLAND

MILESTONES...: 05/76 -CONDUCT SYMPOSIUM
 05/76 -TECHNICAL MANUAL ON FUGITIVE EMISSION MEASUREMENT: UPWIND/DOWNWIN
 05/76 -TECHNICAL MANUAL ON FUGITIVE EMISSION MEASUREMENT: QUASI-STACK
 05/76 -TECHNICAL MANUAL ON FUGITIVE EMISSION MEASUREMENT: ROOF MONITOR
 05/77 -CONDUCT SECOND SYMPOSIUM
 07/77 -TECHNICAL MANUAL ON SAMPLING STORMWATER RUNOFF
 04/78 -DESIGN FUGITIVE ASSESSMENT SAMPLING TRAIN

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001537 SSIE-GMA 2743 1 EPA -68-02-2133 TASK-F624A-053
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVE: TO PROVIDE FUGITIVE EMISSION MEASUREMENT METHODOLOGIES REQUIRED FOR ENVIRONMENTAL
 ASSESSMENT AND CONTROL TECHNOLOGY DEVELOPMENT PROJECTS RELATED TO STATIONARY SOURCE ENERGY AND
 INDUSTRIAL PROCESS PROGRAMS OF THE ENVIRONMENTAL PROTECTION AGENCY. APPROACH: CONDUCT A CONTINUING
 PROGRAM OF EVALUATION, DEVELOPMENT, TESTING, AND FIELD ADAPTATION OF MEASUREMENT TECHNIQUES FOR
 AIRBORNE AND WATERBORNE FUGITIVE EMISSIONS FROM PROCESS AND EFFLUENT STREAMS, INCLUDING THE
 FOLLOWING: REVIEW CURRENT PROGRAMS TO IDENTIFY MEASUREMENT REQUIREMENTS. FORMULATE SPECIFICATIONS
 FOR BASIS SAMPLING AND ANALYSIS PROCEDURES. CONDUCT LABORATORY AND FIELD STUDIES TO DETERMINE
 EFFECTIVENESS OF ADAPTING PROCEDURES TO SPECIFIC PROCESS STREAMS. REVIEW AND CRITIQUE MEASUREMENT
 PROGRAMS DEVELOPED OR PROPOSED IN OTHER EPA PROGRAMS. CONDUCT SAMPLING AND ANALYSIS PROGRAMS FOR
 SPECIAL PROJECTS. PREPARE DOCUMENTS DEFINING RECOMMENDED PROCEDURES AND THEIR APPLICATION TO
 PROCESS STREAMS.

****PROJECT: 01539-SAMPLING AND ANALYSIS OF REDUCED AND OXIDIZED SPECIES IN PROCESS STREAMS**

STARTING/ COMPLETION DATE : 06/76 - 06/79 : FUNDING : ESTIMATED - FY77 / \$ 385000
 TASK CODE=F624A-054 **EPA-68-02-2165 ** (CNTR.) PRIOR FY76 / \$ 779000

EPA OFFICER.: F BRIDEN EPA/IERL - RTP
 INVESTIGATOR.: RF MADDALONE THOMPSON RAMO WOOLDRIDGE INC
 EA BURNS THOMPSON RAMO WOOLDRIDGE INC
 RG BEIMER THOMPSON RAMO WOOLDRIDGE INC

MILESTONES...: 01/78 -REVISE TECHNICAL MANUAL FOR INORGANIC SAMPLING AND ANALYSIS
 06/77 -TECHNICAL MANUAL FOR REDUCED INORGANIC SAMPLING AND ANALYSIS
 06/77 -TECHNICAL MANUAL FOR INORGANIC COMPOUND IDENTIFICATION
 06/77 -EVALUATION OF TOTAL SULFUR AND TOTAL ASH MONITORS FOR COAL
 06/77 -PROCEDURES MANUALS FOR INORGANIC MEASUREMENT IN SPECIFIED PROCESS ES
 01/78 -ISSUE PROCEDURES FOR ANALYSIS OF SULFUR FORMS IN COAL
 02/78 -TECHNICAL MANUAL FOR REDUCED INORGANIC SAMPLING AND ANALYSIS
 06/79 -DEVELOP PROCEDURES FOR COMPOUND

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001539 SSIE-GMA 3355 1 EPA -68-02-2165 TASK-F624A-054
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVE: THE PRIMARY OBJECTIVE OF THIS PROGRAM IS TO PROVIDE THE MEASUREMENT METHODOLOGIES
 REQUIRED FOR ENVIRONMENTAL ASSESSMENT AND CONTROL TECHNOLOGY DEVELOPMENT PROJECTS RELATED TO THE
 STATIONARY SOURCE ENERGY AND INDUSTRIAL PROCESS PROGRAMS OF THE ENVIRONMENTAL PROTECTION AGENCY.
 APPROACH: THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONDUCTING BOTH THE BASIC DEVELOPMENT EFFORT AND
 THE PROGRAMS NECESSARY TO ADAPT, APPLY AND EVALUATE THE APPLICATION OF THESE AND OTHER SAMPLING AND
 ANALYTICAL TECHNIQUES ON SPECIFIC ENGINEERING STUDIES. OUTPUTS: (1) LEVEL 1 MANUAL REVISIONS; (2)
 LIMESTONE FGD DEMO SUPPORT; (3) OCEAN INCINERATION; (4) COAL CONVERSION TEST MANUAL; (5) FLUIDIZED
 BED COMBUSTOR SUPPORT; (6) COAL PROCESSING FLOW METERS; (7) CONTINUOUS FLOW IMPACTOR; (8)
 PARTICULATE MEASUREMENT ERRORS; (9) SO3 PROCEDURE MANUAL; (10) SASS LEVEL I CHECKOUT; (11)
 INORGANIC COMPOUND ANALYSIS; (12) COAL SULFUR MEASUREMENTS; (13) BAGHOUSE EVALUATION.

****PROJECT: 01540-EMISSIONS ASSESSMENT OF CONVENTIONAL COMBUSTION SYSTEMS**

STARTING/ COMPLETION DATE : 09/76 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 1036530
 TASK CODE=F624A-055 **EPA-68-02-2197 ** (CNTR.) PRIOR FY76 / \$ 1201800
 EPA OFFICER.: RA VENEZIA
 INVESTIGATOR.: BJ MATTHEWS
 MILESTONES....: 11/77 -FINAL REPORT FOR RESIDENTIAL SOURCES
 01/78 -FINAL REPORT FOR INTERNAL COMBUSTION, ELECTRICITY GENERATION SOUR
 09/78 -FINAL REPORT EXTERNAL COMBUSTION, ELECTRICITY GENERATION SOURCES
 03/79 -FINAL REPORT COMMERCIAL/INSTITUTIONAL SOURCES
 02/80 -FINAL REPORT INDUSTRIAL SOURCES
 05/80 -FINAL REPORT EXECUTIVE SUMMARY
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001540 SSIE-GMA 3358 1 EPA -68-02-2197
 AP -624A DU -L110 LABT-EMI TASK-F624A-055
 ABSTRACT.....: THIS PROJECT WILL ASSESS THE AIR AND WATER POLLUTANTS FROM FIFTY-ONE COMBUSTION CATEGORIES,
 INCLUDING RESIDENTIAL, COMMERCIAL/INSTITUTIONAL, INDUSTRIAL AND UTILITY, SAMPLING AND ANALYSIS
 INCLUDES THE FOLLOWING: LEVEL 1 - INORGANIC AND ORGANIC ANALYSIS, PARTICULATE MATTER BY AT LEAST
 FOUR SIZE FRACTIONS, PARTICULATE SULFATE, POM, PCB, SOX, AND NOX. THE EMISSION RATES OF THE
 POLLUTANTS WILL BE DETERMINED BY THE MOST APPROPRIATE MEANS, SUCH AS FIELD SAMPLING, MATERIAL
 BALANCE CALCULATIONS, OR MANIPULATION OF EXISTING DATA.

****PROJECT: 01581-PROJECT DEFINITION PHASE STUDY FOR AN INTEGRATED ASSESSMENT OF COAL-BASED ENERGY TECHNOLOGY**

STARTING/ COMPLETION DATE : 01/77 - 07/77 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=F624A-074 **EPA-68-02-2622 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: R HANSEN
 INVESTIGATOR.: RS DAVIDSON
 RF AYERS
 AN CHRISTAKIS
 RW COBB
 EH HALL
 WJ SHEPPARD
 MILESTONES....: 01/77 -CONTRACT AWARD - COMPETITIVE
 07/77 -PHASE I (WORK PLAN AND PROPOSAL FOR PHASE II) - COMPLETED
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001581 SSIE-GMA 3496 EPA -68-02-2622
 AP -624A DU -L110 LABT-EMI TASK-F624A-074
 ABSTRACT.....: OBJECTIVES: THIS PROJECT IS PHASE I - DEFINITION PHASE. WILL INCLUDE THE FOLLOWING OBJECTIVES. 1. A
 METHODOLOGY FOR INTEGRATING THE RESULTS OF COMPLETED AND ONGOING EPA/IERL "ENVIRONMENTAL
 ASSESSMENTS" OF COAL BASED ENERGY AND ENVIRONMENTAL QUALITY CONTROL TECHNOLOGIES. 2. A METHODOLOGY
 FOR CONDUCTING A COMPARATIVE ASSESSMENT OF THE ENVIRONMENTAL, SOCIAL, ECONOMIC, AND ENERGY IMPACTS
 OF COAL BASED ENERGY TECHNOLOGIES, SUPPLY SYSTEMS, AND END USES. 3. A METHODOLOGY FOR ASSESSING
 NATIONAL IMPACTS FOR ALL COMPONENTS OF COAL ENERGY SUPPLY SYSTEMS; EXTRACTION; FUEL STOCK
 TRANSPORTATION; PROCESSING; CONVERSION; ENERGY PRODUCT TRANSPORTATION; AND END USE. 4. APPROACHES
 TO IDENTIFYING, ANALYZING, AND COMPARING TECHNOLOGICAL AND INSTITUTIONAL METHODS OF AVOIDING, OR
 MITIGATING UNDESIRABLE CONSEQUENCES OF COAL ENERGY DEVELOPMENT. 5. PROPOSE WAYS OF IDENTIFYING AND
 COMPARING THE EFFECTS OF ALTERNATIVE ENERGY RELATED ENVIRONMENTAL POLICIES AND POLICY
 IMPLEMENTATION STRATEGIES. APPROACH: BATTELLE'S COLUMBUS LABORATORIES WILL PREPARE A WORKPLAN FOR
 CONDUCTING A FULL SCALE ASSESSMENT OF COAL-BASED TECHNOLOGY AND DEVELOP A COST PROPOSAL. THE
 SUBJECT AREA OF THE WORKPLAN WILL HAVE AS ITS SCOPE: COAL PRODUCTION, PREPARATION, TRANSPORTATION,
 CONVERSION, AND UTILIZATION. THE BOUNDARIES FOR THE FULL ASSESSMENT ARE TO BE CHOSEN IN THE PROJECT
 DEFINITION PHASE. FORECASTING OF THE TOTAL COAL DEMAND AS WELL AS THE DEMAND FOR OTHER FUELS WILL
 BE INCLUDED IN THE ANALYSIS. FOR ANY LEVEL OF COAL DEMAND IMPACTS WILL BE FORECAST, AND TRADEOFFS
 BETWEEN DIFFERENT COAL UTILIZATION SYSTEMS WILL BE COVE

****PROJECT: 01562-AN INTEGRATED ASSESSMENT OF COAL-BASED ENERGY TECHNOLOGIES - PROJECT
DEFINITION PHASE**

STARTING/ COMPLETION DATE : 01/77 - 07/77 : FUNDING : ESTIMATED - FY77 / \$ 50000
TASK CODE=F624A-075 **EPA-68-02-2621 ** (CNTR.) PRIOR FY /

EPA OFFICER.: R HANSEN EPA/IERL - RTP
INVESTIGATOR.: JD STUART RADIANT CORP
CP BARTOSH RADIANT CORP
BR EPPRIGHT RADIANT CORP
JC LACY RADIANT CORP
PS DZIERLENGA RADIANT CORP
SH SPURR UNIVERSITY OF TEXAS
M BLISSETT UNIVERSITY OF TEXAS

MILESTONES.... 01/77 -CONTRACT AWARD - COMPETITIVE
07/77 -PHASE I (WORK PLAN AND PROPOSAL FOR PHASE II) - COMPLETED

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
ORDIS CODES... RECN-001562 SSIE-GMA 4407 EPA -68-02-2621 TASK-F624A-075
AP -624A DU -L110 LABT-EMI

ABSTRACT..... DEVELOP METHODOLOGY AND FORMULATE A WORK PLAN FOR A TWO AND ONE-HALF YEAR PROGRAM. (1) TO COLLECT AND INTEGRATE THE RESULTS OF (A) EPA'S ONGOING EFFORTS AT ASSESSING THE ENVIRONMENTAL, ENERGY, AND ECONOMIC IMPACT OF CONVENTIONAL COAL-BASED SYSTEMS, (B) THE RECENTLY INITIATED ENVIRONMENTAL ASSESSMENTS OF EMERGING COAL-BASED ENERGY TECHNOLOGIES SPONSORED BY EPA, AND (C) OTHER STUDIES BY OTHER ORGANIZATIONS (OTHER THAN EPA) ON RELATED TOPICS. (2) TO IDENTIFY, DESCRIBE, AND QUANTIFY THE RANGE AND MAGNITUDE OF BIOPHYSICAL, SOCIOECONOMIC, AND ENERGY IMPACTS ASSOCIATED WITH EACH COAL-BASED TECHNOLOGY. (3) TO IDENTIFY, DESCRIBE, COMPARE, AND QUANTIFY WHERE POSSIBLE THE RANGE AND MAGNITUDE OF BIOPHYSICAL, SOCIOECONOMIC, AND ENERGY IMPACTS OF ALTERNATIVE MIXES, RATES, LEVELS, AND TIMING OF THE DEVELOPMENT AND DEPLOYMENT OF COAL-BASED ENERGY TECHNOLOGIES, SUPPLY SYSTEMS, AND END USES. (4) TO IDENTIFY AND COMPARATIVELY ANALYZE TECHNOLOGICAL AND INSTITUTIONAL METHODS OF AVOIDING OR MITIGATING UNDESIRABLE IMPACTS. PARTICULAR ATTENTION WILL BE GIVEN TO THE RESPONSIBILITIES OF THE ENVIRONMENTAL PROTECTION AGENCY AS SPECIFIED BY RELEVANT LAWS, DIRECTIONS, ORDERS, ETC.

****PROJECT: 01563-INTEGRATED ASSESSMENT OF COAL BASED ENERGY TECHNOLOGY--PROJECT
DEFINITION PHASE**

STARTING/ COMPLETION DATE : 01/77 - 07/77 : FUNDING : ESTIMATED - FY77 / \$ 50000
TASK CODE=F624A-076 **EPA-68-02-2623 ** (CNTR.) PRIOR FY /

EPA OFFICER.: R HANSEN EPA/IERL - RTP
INVESTIGATOR.: W HARMAN S R I INTERNATIONAL
P DORSET S R I INTERNATIONAL

MILESTONES.... 01/77 -CONTRACT AWARD - COMPETITIVE
07/77 -PHASE I (WORK PLAN AND PROPOSAL FOR PHASE II) COMPLETED

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
ORDIS CODES... RECN-001563 SSIE-GMA 3505 EPA -68-02-2623 TASK-F624A-076
AP -624A DU -L110 LABT-EMI

ABSTRACT..... THE PROJECT DEFINITION PHASE OF THIS STUDY CONSISTS OF EFFORTS TO EXPLICITLY SCOPE THE SUBSEQUENT ASSESSMENT WORK; ESTABLISH PROCEDURES TO SELECT THE MOST RELEVANT TECHNOLOGIES; IDENTIFY AND ASSEMBLE RELEVANT LITERATURE AND DATA; DELINEATE METHODOLOGIES TO UNCOVER AND ANALYZE BOTH THE DIRECT AND INDIRECT ENVIRONMENTAL, ECONOMIC, SOCIAL, INSTITUTIONAL, AND LEGAL IMPACTS OF DEPLOYING THESE TECHNOLOGIES; DEFINE METHODOLOGIES FOR COMPARING THE IMPACTS OF THE VARIOUS TECHNOLOGIES; AND DEVELOP POLICY ALTERNATIVES FOR THE DEVELOPMENT OF COAL-BASED TECHNOLOGIES. A PLAN TO PACKAGE THE RESULTS IN A FORM THAT WILL BE USEFUL TO ENVIRONMENTAL AND ENERGY POLICY DECISIONMAKERS WILL ALSO BE DEVELOPED. THE PRODUCT OF THE PROJECT DEFINITION PHASE WILL, IN EFFECT, BE A DETAILED PROPOSAL FOR THE CONDUCT OF THE ACTUAL ASSESSMENT ITSELF WHICH WOULD BE DONE IN THE SUBSEQUENT INTEGRATED ASSESSMENT PHASE.

****PROJECT: 01564-A SURVEY OF THE USE AND EMISSION OF SELECTED CARCINOGENS IN NEW JERSEY**

STARTING/ COMPLETION DATE : 10/77 - 10/80 : FUNDING : ESTIMATED - FY77 / \$ 55000
TASK CODE=F624A-077 **EPA-R805501-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: JA MCSORLEY EPA/IERL - RTP
INVESTIGATOR.: PW PREUSS STATE DEPT OF ENV PROT

MILESTONES.... 09/77 -GRANT AWARD
09/80 -GRANT COMPLETION

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
ORDIS CODES... RECN-001564 SSIE-GMA 4131 EPA -R805501-01 TASK-F624A-077
AP -624A DU -L110 LABT-EMI

ABSTRACT..... OBJECTIVES OF THE PROJECT: 1. TO ESTABLISH A COMPUTERIZED DATA BASE CONCERNING THE MANUFACTURE, USE, STORAGE, PROCESSING, FORMATION, RELEASE, DISPOSAL AND REPACKAGING IN NJ OF A GROUP OF CARCINOGENIC SUBSTANCES SELECTED ON THE BASIS OF THEIR LARGE VOLUME OF PRODUCTION AND/OR THEIR CARCINOGENICITY. 2. TO IDENTIFY THE AREA OF THE STATE AND POPULATION GROUP THAT ARE SUBJECT TO AN INCREASED CANCER RISK DUE TO EXPOSURE TO CANCER CAUSING SUBSTANCES AND OTHER TOXIC AGENTS IN THE ENVIRONMENT. 3. TO ESTABLISH A BASE FOR THE STUDY OF METHODS OF REDUCING OR ELIMINATING THE RELEASE OF CARCINOGENS INTO THE ENVIRONMENT. THE DATA BASE WILL PERMIT DETERMINATIONS OF THE FOLLOWING: A. A COMPREHENSIVE INVENTORY OF THE SELECTED CARCINOGENS IN NEW JERSEY; B. THE INDUSTRIAL LOCATIONS WHERE THE SELECTED CARCINOGENS ARE USED, MANUFACTURED, STORED, RELEASED, FORMED, REPACKAGED, ETC., AND THE QUANTITY OF THE CARCINOGEN HANDLED AT EACH LOCATION; C. THE PRODUCTS WHICH ARE MANUFACTURED FROM THE SELECTED CARCINOGENS; D. THE QUANTITY OF THE SUBSTANCES EMITTED AND/OR RELEASED TO THE ATMOSPHERE, WATER AND SOLID WASTE STREAM; E. THE POTENTIAL OCCUPATIONAL AND COMMUNITY EXPOSURE TO THE SELECTED MATERIALS.

****PROJECT: 01566-QUICK REACTION ENGINEERING AND TECHNICAL SERVICES**

STARTING/ COMPLETION DATE : 03/77 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 283600
 TASK CODE=F624A-079 **EPA-68-02-2611 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: J MCSORLEY EPA/IERL - RTP
 INVESTIGATOR.: F MORENO ACUREX CORP AEROTHERM DIV
 MILESTONES...: 03/77 -CONTRACT AWARD
 03/79 -ESTIMATED CONTRACT COMPLETION DATE
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001566 SSIE-GMA 4196 EPA -68-02-2611 TASK-F624A-079
 AP -624A DU -L110 LABT-EMI
 ABSTRACT.....: THE OBJECTIVE OF THIS PROGRAM IS TO PROVIDE SUPPORT AND ASSISTANCE TO THE ENVIRONMENTAL PROTECTION AGENCY. WORK WILL BE ACCOMPLISHED BY MEANS OF SPECIFIC WORK ASSIGNMENTS MADE BY THE AGENCY. PLANNED AREAS OF WORK ARE LISTED BELOW. 1) ECONOMIC AND ENVIRONMENTAL ASSESSMENT OF POLLUTION CONTROL EQUIPMENT; 2) PROCESS ANALYSIS; 3) PREPARATION OF COST ESTIMATES FOR POLLUTION CONTROL SYSTEMS BEING DEVELOPED FOR EPA; 4) PROCESS RESEARCH; 5) EVALUATION OF ENERGY CONSERVATION POTENTIAL OF NEW POLLUTION CONTROL TECHNOLOGIES; 6) ENGINEERING ANALYSIS OF MAJOR EPA PROGRAM ELEMENTS; 7) ASSESSMENT OF R AND D PROGRAMS IN COAL CONVERSION, COAL EXTRACTION, AND COAL RECLAMATION; 8) SURVEYS OF PROCESS EMISSIONS AND POLLUTION CONTROL TECHNOLOGY; 9) IDENTIFICATION OF NEW ENVIRONMENTALLY ACCEPTABLE POWER SYSTEMS OFFERING IMPROVED UTILIZATION OF FOSSIL FUELS; 10) TECHNICAL SERVICES INCLUDING SITE PLANNING RECOMMENDATIONS, PROCESS EQUIPMENT DESIGN, REPORT PREPARATION, DATA COMPILATION, PREPARATION OF TECHNICAL SYMPOSIA, AND RELATED SERVICES; 11) ASSISTANCE TO EPA REGIONAL OFFICES IN THE AREAS LIS

****PROJECT: 01567-ENGINEERING SERVICES IN SUPPORT OF ENVIRONMENTAL PROTECTION AGENCY
 SPECIFIC WORK ASSIGNMENTS**

STARTING/ COMPLETION DATE : 03/77 - 03/79 : FUNDING : ESTIMATED - FY77 / \$ 110000
 TASK CODE=F624A-080 **EPA-68-02-2616 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: J MCSORLEY EPA/IERL - RTP
 INVESTIGATOR.: GH DYER BECHTEL NATIONAL INC
 RG DUTHIE BECHTEL NATIONAL INC
 MILESTONES...: 03/77 -CONTRACT AWARD
 03/79 -ESTIMATED CONTRACT COMPLETION DATE
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001567 SSIE-GMA 4202 EPA -68-02-2616 TASK-F624A-080
 AP -624A DU -L110 LABT-EMI
 ABSTRACT.....: THIS CONTRACT PROVIDES FOR ENGINEERING AND TECHNICAL SERVICES IN SUPPORT OF VARIOUS PROJECTS AS MAY BE ASSIGNED BY EPA OR OTHER RELATED GOVERNMENT ENTITIES. SPECIFIC PROJECTS THAT ARE PERFORMED WILL FALL WITHIN THE FOLLOWING CATEGORY TITLES: 1. ASSESSMENT OF ENVIRONMENTAL AND ECONOMIC IMPACT OF THE POLLUTION CONTROL SYSTEMS AS THEY BECOME COMMERCIALY AVAILABLE TO THE USER INDUSTRIES. 2. PROCESS ANALYSIS. 3. PROVIDING DETAILED COST ESTIMATES FOR THE POLLUTION CONTROL SYSTEMS THAT ARE BEING DEVELOPED BY EPA. 4. PROCESS RESEARCH. 5. EVALUATING THE ENERGY CONSERVATION POTENTIAL OF NEW POLLUTION CONTROL TECHNOLOGIES WITH THE EMPHASIS PLACED ON NEAR-TERM PAYOFF SYSTEMS. 6. ENGINEERING ANALYSIS. 7. ASSESSING R AND D PROGRAMS IN COAL LIQUEFACTION, LOW, MEDIUM, AND HIGH BTU GASIFICATION; ADVANCED COMBINATION RESEARCH; AND IMPROVED COAL EXTRACTION AND RECLAMATION TECHNIQUES. 8. PROCESS EMISSIONS AND CONTROL TECHNOLOGY SURVEY. 9. IDENTIFYING NEW ENVIRONMENTALLY ACCEPTABLE POWER SYSTEMS THAT CAN PROVIDE CLEANER, MORE EFFICIENT UTILIZATION OF FOSSIL FUELS. 10. ASSOCIATED TECHNICAL SERVICES. 11. REGIONAL ASSISTANCE AND STATE IMPLEMENTATION PLANNING.

****PROJECT: 01568-NONPERSONAL, QUICK REACTION ENGINEERING AND TECHNICAL SERVICES**

STARTING/ COMPLETION DATE : 02/77 - 02/79 : FUNDING : ESTIMATED - FY77 / \$ 15000
 TASK CODE=F624A-081 **EPA-68-02-2607 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: JH MCSORLEY EPA/IERL - RTP
 INVESTIGATOR.: R BRADWAY G C A CORP TECH DIV
 R HALL G C A CORP TECH DIV
 P FENNELLY G C A CORP TECH DIV
 R PATTERSON G C A CORP TECH DIV
 N SURPRENANT G C A CORP TECH DIV
 A WERNER G C A CORP TECH DIV
 MILESTONES...: 03/77 -CONTRACT AWARD
 03/79 -ESTIMATED CONTRACT COMPLETION DATE
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001568 SSIE-GMA 3557 EPA -68-02-2607 TASK-F624A-081
 AP -624A DU -L110 LABT-EMI
 ABSTRACT.....: THE WORK TO BE PERFORMED UNDER THIS CONTRACT IS IN SUPPORT OF THE TECHNICAL FUNCTIONS CARRIED OUT BY THE ENVIRONMENTAL PROTECTION AGENCY. SPECIFIC WORK ASSIGNMENTS WILL BE FOR WORK IN THE FOLLOWING AREAS: 1. ASSESSMENT OF ENVIRONMENTAL AND ECONOMIC IMPACT OF THE POLLUTION CONTROL SYSTEMS AS THEY BECOME COMMERCIALY AVAILABLE TO THE USER INDUSTRIES. 2. PROCESS ANALYSIS. 3. PROVIDING DETAILED COST ESTIMATES FOR POLLUTION CONTROL SYSTEMS THAT ARE BEING DEVELOPED BY THE EPA. 4. PROCESS RESEARCH. 5. EVALUATING THE ENERGY CONSERVATION POTENTIAL OF NEW POLLUTION CONTROL TECHNOLOGIES WITH THE EMPHASIS PLACED ON NEAR TERM PAYOFF SYSTEMS. 6. ENGINEERING ANALYSIS. 7. ASSESSING R/D PROGRAMS IN COAL LIQUEFACTION, LOW, MEDIUM, AND HIGH BTU GASIFICATION; ADVANCED COMBUSTION RESEARCH; AND IMPROVED COAL EXTRACTION AND RECLAMATION TECHNIQUES. 8. PROCESS EMISSIONS AND CONTROL TECHNOLOGY SURVEY. 9. IDENTIFYING NEW ENVIRONMENTALLY ACCEPTABLE POWER SYSTEMS THAT CAN PROVIDE CLEANER, MORE EFFICIENT UTILIZATION OF FOSSIL FUELS. 10. ASSOCIATED TECHNICAL SERVICES. 11. REGIONAL ASSISTANCE AND STATE IMPLEMENTATION PLANNING

****PROJECT: 01589-NONPERSONAL QUICK REACTION ENGINEERING AND TECHNICAL SERVICES**

STARTING/ COMPLETION DATE : 03/77 - 03/79 : FUNDING : ESTIMATED - FY77 / \$ 10000
 TASK CODE=F624A-082 **EPA-68-02-2606 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: J MCSORLEY
 INVESTIGATOR.: V YAMADA
 MILESTONES.... 03/77 -CONTRACT AWARD
 03/79 -ESTIMATED CONTRACT COMPLETION DATE
 PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... RECN-001589 SSIE-GMA 4199 EPA -68-02-2606 TASK-F624A-082
 AP -624A DU -L110 LABY-EMI
 ABSTRACT..... PACIFIC ENVIRONMENTAL SERVICES, INC. (PES) WILL PERFORM ON A WORK ASSIGNMENT BASIS STUDIES IN THE
 FOLLOWING AREAS: (1) ASSESSMENT OF ENVIRONMENTAL AND ECONOMIC IMPACT OF THE POLLUTION CONTROL
 SYSTEMS AS THEY BECOME COMMERCIALY AVAILABLE TO THE USER INDUSTRIES; (2) PROCESS ANALYSIS; (3)
 PROVIDING DETAILED COST ESTIMATES FOR THE POLLUTION CONTROL SYSTEMS THAT ARE BEING DEVELOPED BY
 EPA; (4) PROCESS RESEARCH; (5) EVALUATING THE ENERGY CONSERVATION POTENTIAL OF NEW POLLUTION
 CONTROL TECHNOLOGIES WITH THE EMPHASIS PLACED ON NEAR-TERM PAYOFF SYSTEMS; (6) ENGINEERING
 ANALYSIS; (7) ASSESSING R AND D PROGRAMS IN COAL LIQUEFACTION, LOW, MEDIUM, AND HIGH BTU
 GASIFICATION; ADVANCED COMBINATION RESEARCH; AND IMPROVED COAL EXTRACTION AND RECLAMATION
 TECHNIQUES; (8) PROCESS EMISSIONS AND CONTROL TECHNOLOGY SURVEY; (9) IDENTIFYING NEW
 ENVIRONMENTALLY ACCEPTABLE POWER SYSTEMS THAT CAN PROVIDE CLEANER MORE EFFICIENT UTILIZATION OF
 FOSSIL FUELS; (10) ASSOCIATED TECHNICAL SERVICES; (11) REGIONAL ASSISTANCE AND

****PROJECT: 01570-NON-PERSONAL, QUICK REACTION ENGINEERING AND TECHNICAL SERVICES**

STARTING/ COMPLETION DATE : 03/77 - 03/79 : FUNDING : ESTIMATED - FY77 / \$ 270800
 TASK CODE=F624A-083 **EPA-68-02-2603 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: JA MCSORLEY
 INVESTIGATOR.: RW GERSTLE
 TW DEVITT
 MILESTONES.... 03/77 -CONTRACT AWARD
 03/79 -ESTIMATED CONTRACT COMPLETION DATE
 PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... RECN-001570 SSIE-GMA 4197 EPA -68-02-2603 TASK-F624A-083
 AP -624A DU -L110 LABY-EMI
 ABSTRACT..... THE WORK TO BE PERFORMED UNDER THIS CONTRACT IS IN SUPPORT OF THE TECHNICAL FUNCTIONS CARRIED OUT BY
 THE ENVIRONMENTAL PROTECTION AGENCY. SPECIFIC WORK ASSIGNMENTS WILL BE FOR WORK IN THE FOLLOWING
 AREAS: 1. ASSESSMENT OF ENVIRONMENTAL AND ECONOMIC IMPACT OF THE POLLUTION CONTROL SYSTEMS AS THEY
 BECOME COMMERCIALY AVAILABLE TO THE USER INDUSTRIES. 2. PROCESS ANALYSIS. 3. PROVIDING DETAILED
 COST ESTIMATES FOR POLLUTION CONTROL SYSTEMS THAT ARE BEING DEVELOPED BY THE EPA. 4. EVALUATING THE
 ENERGY CONSERVATION POTENTIAL OF NEW POLLUTION CONTROL TECHNOLOGIES WITH THE EMPHASIS PLACED ON
 NEAR TERM PAYOFF SYSTEMS. 6. ENGINEERING ANALYSIS. 7. ASSESSING R/D PROGRAMS IN COAL LIQUEFACTION,
 LOW, MEDIUM, AND HIGH BTU GASIFICATION; ADVANCED COMBUSTION RESEARCH; AND IMPROVED COAL EXTRACTION
 AND RECLAMATION TECHNIQUES. 8. PROCESS EMISSIONS AND CONTROL TECHNOLOGY SURVEY. 9. IDENTIFYING NEW
 ENVIRONMENTALLY ACCEPTABLE POWER SYSTEMS THAT CAN PROVIDE CLEANER, MORE EFFICIENT UTILIZATION OF
 FOSSIL FUELS. 10. ASSOCIATED TECHNICAL SERVICES. 11. REGIONAL ASSISTANCE AND STATE IMPLEMENTATION
 PLANNING.

****PROJECT: 01571-NON-PERSONAL, QUICK REACTION ENGINEERING AND TECHNICAL SERVICES**

STARTING/ COMPLETION DATE : 05/77 - 05/79 : FUNDING : ESTIMATED - FY77 / \$ 15000
 TASK CODE=F624A-084 **EPA-68-02-2619 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: JA MCSORLEY
 INVESTIGATOR.: WM TALBERT
 MILESTONES.... 03/77 -CONTRACT AWARD
 03/79 -ESTIMATED CONTRACT COMPLETION DATE
 PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... RECN-001571 SSIE-GMA 4201 EPA -68-02-2619 TASK-F624A-084
 AP -624A DU -L110 LABY-EMI
 ABSTRACT..... AN EPA CONTRACTING OFFICER WILL ISSUE SPECIFIC TASKS OF WORK WHICH WILL FALL INTO ONE OF THE
 FOLLOWING CATEGORIES: 1. ASSESSMENT OF THE ENVIRONMENTAL AND ECONOMIC IMPACT OF POLLUTION CONTROL
 SYSTEMS. 2. PROCESS ANALYSIS OF EARLY STAGE RESEARCH RESULTS. 3. COST ESTIMATES FOR THE POLLUTION
 CONTROL SYSTEMS BEING DEVELOPED BY THE EPA. 4. ENGAGING IN PROCESS RESEARCH. 5. EVALUATION OF THE
 ENERGY CONSERVATION POTENTIAL OF NEW POLLUTION CONTROL TECHNOLOGIES. 6. DETERMINE THE ENVIRONMENTAL
 IMPACTS THAT RESULT FROM AIR POLLUTION CONTROL PROCESSES AND SYSTEMS. 7. ASSESSMENT OF R AND D
 PROGRAMS IN COAL LIQUEFACTION; LOW-, MEDIUM, AND HIGH-BTU GASIFICATION; ADVANCED COMBUSTION
 RESEARCH; AND IMPROVED COAL EXTRACTION AND RECLAMATION TECHNIQUES. 8. SURVEY PROCESS EMISSIONS AND
 CONTROL TECHNOLOGY OF DESIGNATED INDUSTRIAL SOURCES TO DEFINE RESEARCH DEVELOPMENT, AND
 DEMONSTRATION REQUIREMENTS. 9. IDENTIFY NEW ENVIRONMENTALLY ACCEPTABLE FOSSIL FUEL POWER SYSTEMS.
 10. PROVIDE TECHNICAL SERVICES IN THE AREAS OF SITE PLANNING, CONFIGURATION OF POWER PLANT PROCESS
 LAYOUTS, PROCESS EQUIPMENT DESIGN, PREPARATION OF ENGINEERING REPORTS SUCH AS COMPUTATION OF
 EMISSION BY PROCESS AND SOURCE, AND OTHER ENGINEERING STUDIES. 11. ASSIST REGIONAL EPA OFFICES AND
 STATE POLLUTION CONTROL AGENCIES IN CONTROL IMPLEMENTATION PLANNING. THE MAJORITY OF WORK
 ASSIGNMENTS WILL BE COMPLETED BY PULLMAN KELLOGG PERSONNEL, BUT A PART OF THE OVERALL EFFORT MAY BE
 SUBCONTRACTED TO OUTSIDE COMPANIES.

****PROJECT: 01572-QUICK RESPONSE NON-PERSONAL TECHNICAL AND ENGINEERING SERVICES**

STARTING/ COMPLETION DATE : 02/77 - 02/79 : FUNDING : ESTIMATED - FY77 / \$ 820160
 TASK CODE=F624A-085 **EPA-68-02-2608 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: JA MCSORLEY EPA/IERL - RTP
 INVESTIGATOR.: RM WELLS RADIANT CORP
 MILESTONES...: 03/77 -CONTRACT AWARD
 03/79 -ESTIMATED CONTRACT COMPLETION DATE
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: REC-001572 SSIE-GMA 4200 EPA -68-02-2608 TASK-F624A-085
 AP -624A DU -L110 LABT-EMI
 ABSTRACT.....: RADIANT WILL SUPPORT THE TECHNICAL FUNCTIONS OF EPA IN THE FOLLOWING AREAS: 1. ASSESSMENT OF ENVIRONMENTAL AND ECONOMIC IMPACT OF POLLUTION CONTROL SYSTEMS AS THEY BECOME COMMERCIALY AVAILABLE TO THE USER INDUSTRIES. 2. PROCESS ANALYSIS. 3. PROVIDING DETAILED COST ESTIMATES FOR POLLUTION CONTROL SYSTEMS BEING DEVELOPED BY EPA. 4. PROCESS RESEARCH. 5. EVALUATING THE ENERGY CONSERVATION POTENTIAL OF NEW POLLUTION CONTROL TECHNOLOGIES WITH THE EMPHASIS PLACED ON NEAR-TERM PAYOFF SYSTEMS. 6. ENGINEERING ANALYSIS. 7. ASSESSING R AND D PROGRAMS IN COAL LIQUEFACTION, COAL GASIFICATION, ADVANCED COMBINATION RESEARCH, AND IMPROVED COAL EXTRACTION AND RECLAMATION TECHNIQUES. 8. SURVEYING PROCESS EMISSIONS AND CONTROL TECHNOLOGY. 9. IDENTIFYING NEW ENVIRONMENTALLY ACCEPTABLE POWER SYSTEMS THAT CAN PROVIDE CLEANER, MORE EFFICIENT UTILIZATION OF FOSSIL FUELS. 10. ASSOCIATED TECHNICAL SERVICES. SPECIFIC WORK ASSIGNMENTS WILL BE MADE BY THE ISSUANCE OF INDIVIDUAL WORK ASSIGNMENTS.

****PROJECT: 01573-QUICK REACTION ENGINEERING AND TECHNICAL SERVICES**

STARTING/ COMPLETION DATE : 02/77 - 02/79 : FUNDING : ESTIMATED - FY77 / \$ 178830
 TASK CODE=F624A-086 **EPA-68-02-2610 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: J MCSORLEY EPA/IERL - RTP
 INVESTIGATOR.: S OGLESBY SOUTHERN RESEARCH INST
 MILESTONES...: 03/77 -CONTRACT AWARD
 03/79 -ESTIMATED CONTRACT COMPLETION DATE
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: REC-001573 SSIE-GMA 4195 EPA -68-02-2610 TASK-F624A-086
 AP -624A DU -L110 LABT-EMI
 ABSTRACT.....: SOUTHERN RESEARCH INSTITUTE WILL FURNISH THE NECESSARY PERSONNEL, MATERIALS, SERVICES, EQUIPMENT, FACILITIES AND OTHERWISE DO ALL THINGS NECESSARY FOR OR INCIDENT TO THE SUPPORT OF THE EPA IN THE FUNCTIONS STATED BELOW: 1. ASSESSMENT OF ENVIRONMENTAL AND ECONOMIC IMPACT OF POLLUTION CONTROL SYSTEMS AS THEY BECOME AVAILABLE TO INDUSTRY. 2. PROCESS ANALYSIS. 3. PROVIDE DETAILED COST ESTIMATES FOR POLLUTION CONTROL SYSTEMS BEING DEVELOPED BY EPA. 4. PROCESS RESEARCH. 5. EVALUATE THE ENERGY CONSERVATION POTENTIAL OF NEW POLLUTION CONTROL TECHNOLOGIES WITH THE EMPHASIS PLACED ON NEAR-TERM PAYOFF SYSTEMS. 6. ENGINEERING ANALYSIS. 7. ASSESS R AND D PROGRAMS IN COAL LIQUEFACTION, LOW, MEDIUM, AND HIGH BTU GASIFICATION; ADVANCED COMBINATION RESEARCH AND IMPROVED COAL EXTRACTION AND RECLAMATION TECHNIQUES. 8. PROCESS EMISSIONS AND CONTROL TECHNOLOGY SURVEY. 9. IDENTIFY NEW ENVIRONMENTALLY ACCEPTABLE POWER SYSTEMS THAT CAN PROVIDE CLEANER, MORE EFFICIENT UTILIZATION OF FOSSIL FUELS. 10. ASSOCIATED TECHNICAL SERVICES. 11. REGIONAL ASSISTANCE AND STATE IMPLEMENTATION PLANNING.

****PROJECT: 01574-NONPERSONAL, QUICK REACTION ENGINEER AND TECHNICAL SERVICES (MOSC)**

STARTING/ COMPLETION DATE : 03/77 - 03/79 : FUNDING : ESTIMATED - FY77 / \$ 270800
 TASK CODE=F624A-087 **EPA-68-02-2613 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: JA MCSORLEY EPA/IERL - RTP
 INVESTIGATOR.: I ZUCKERMAN THOMPSON RAMO WOOLDRIDGE INC
 MILESTONES...: 03/77 -CONTRACT AWARD
 03/79 -ESTIMATED CONTRACT COMPLETION DATE
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: REC-001574 SSIE-GMA 3563 EPA -68-02-2613 TASK-F624A-087
 AP -624A DU -L110 LABT-EMI
 ABSTRACT.....: THE WORK TO BE PERFORMED UNDER THIS CONTRACT INVOLVES SUPPORT OF THE TECHNICAL FUNCTIONS CARRIED OUT BY THE ENVIRONMENTAL PROTECTION AGENCY. SPECIFIC WORK ASSIGNMENTS WILL BE MADE BY ISSUANCE OF INDIVIDUAL TASK ORDERS. THE CONTRACTOR SHALL SUPPLY THE NECESSARY LABOR, MATERIALS, AND FACILITIES REQUIRED FOR PERFORMANCE OF EACH INDIVIDUAL TASK ORDER FOR WORK IN THE AREAS DELINEATED BELOW: 1. ASSESSMENT OF ENVIRONMENTAL AND ECONOMIC IMPACT OF THE POLLUTION CONTROL SYSTEMS. 2. PROCESS ANALYSIS OF RESEARCH RESULTS TO DETERMINE TECHNICAL FEASIBILITY. 3. DEVELOPMENT OF DETAILED COST ESTIMATES FOR THE POLLUTION CONTROL SYSTEMS THAT ARE BEING DEVELOPED BY EPA. 4. PROCESS RESEARCH INCLUDING PROCESS CHEMISTRY, REACTION KINETICS, OR OTHER PHENOMENA; DEVELOPMENT OF ANALYTICAL METHODS; AND CHEMICAL ANALYSES OF PROCESS MATERIALS. 5. EVALUATION OF THE ENERGY CONSERVATION POTENTIAL OF NEW POLLUTION CONTROL TECHNIQUES. 6. ASSESSMENT OF R AND D PROGRAMS IN COAL LIQUEFACTION; COAL GASIFICATION; ADVANCED COMBUSTION RESEARCH; AND IMPROVED COAL EXTRACTION AND RECLAMATION TECHNIQUES. 7. PROCESS EMISSIONS AND CONTROL TECHNOLOGY SURVEYS OF DESIGNATED INDUSTRIAL SOURCES. 8. IDENTIFICATION OF NEW ENVIRONMENTALLY ACCEPTABLE POWER SYSTEMS THAT CAN PROVIDE CLEANER, MORE EFFICIENT UTILIZATION OF FOSSIL FUELS. 9. ASSOCIATED TECHNICAL SERVICES INCLUDING PREPARATION OF SPECIAL ENGINEERING REPORTS, REPORTS OF SPECIFIC ENVIRONMENTAL SCIENCE AND TECHNOLOGY DEVELOPMENTS, AND THE FORMULATION AND PREPARATION OF TECHNICAL SYMPOSIA RELATED TO POLLUTION CONTROL SYSTEMS. 10. REGIONAL ASSISTANCE AND STATE IMPLEMENTATION PLANNING, SUPPORT ON AN AS-NEEDED BASIS TO THE EPA REGIONAL OFFICES AND, IN SOME CASES, TO VARIOUS STATE AND LOCAL POLLUTION CONTROL AGENCIES.

****PROJECT: 01578-MEASUREMENT AND EVALUATION PROCEDURES FOR ENVIRONMENTAL R AND D**

STARTING/ COMPLETION DATE : 07/77 - 06/78 : FUNDING : ESTIMATED - FY77 / \$ 136451
 TASK CODE=F624A-089 **EPA-RB05356-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: SZ SHARIQ EPA/IERL - RTP
 INVESTIGATOR.: AH RUBENSTEIN NORTHWESTERN UNIV
 PH FAROUHAR NORTHWESTERN UNIV
 N BAKER UNIVERSITY OF CINCINNATI
 WE SOUDER UNIVERSITY OF PITTSBURGH
 AP HURTER NORTHWESTERN UNIV
 E GEISLER NORTHEASTERN ILL. STATE UNIV.
 AK CHAKRABARTI DREXEL UNIV

MILESTONES.... 06/78 -PHASE I FINAL REPORT: RECOMMENDATIONS ON MEASUREMENT AND EVALUATI
 PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... RECN-001576 SSIE-GMA 4129 EPA -RB05356-01 TASK-F624A-089
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... AS PART OF ITS EFFORTS IN PROMOTING BOTH IMPROVED ENVIRONMENTAL ASSESSMENTS AND POLLUTION CONTROL
 TECHNOLOGIES FOR INDUSTRIAL PROCESSES AND ENERGY PRODUCTION, IERL-RTP CARRIES OUT FIVE BASIC
 ACTIVITIES: (1) THE ASSESSMENT OF AREAS WHERE CONTROL TECHNOLOGIES ARE LIKELY TO HAVE SIGNIFICANT
 ENVIRONMENTAL IMPACT, (2) THE TRANSLATION OF SUCH ASSESSMENTS INTO SPECIFIC R AND D WORK UNITS AND
 THE ALLOCATION OF FUNDS NEEDED TO CARRY OUT THIS WORK, (3) THE IDENTIFICATION OF PROJECTS AND
 FUNDING OF CONTRACTORS TO ACCOMPLISH THE WORK UNITS PLANNED, (4) THE MONITORING AND EVALUATION OF
 THE PROGRESS AND PERFORMANCE ON VARIOUS R AND D PROJECTS, AND (5) THE DISSEMINATION OF RESULTS FROM R
 AND D PROJECTS TO POTENTIAL USERS. THE PRIMARY GOAL OF THE PROPOSED RESEARCH IS TO SUPPORT THESE
 BASIC ACTIVITIES AT IERL-RTP BY PROVIDING EFFECTIVE METHODS TO: (1) IDENTIFY THE TECHNOLOGICAL,
 ENVIRONMENTAL, AND RELATED GOALS NEEDED TO DETERMINE HIGH IMPACT AREAS FOR R AND D PLANNING, (2)
 ESTABLISH PRIORITIES AMONG SUB-OBJECTIVES AND WORK UNITS SO THAT RATIONAL BUDGET ALLOCATION
 DECISIONS CAN BE MADE, (3) HELP IMPROVE THE DECISION/BUDGETING PROCESS AT VARIOUS ORGANIZATIONAL
 LEVELS AT IERL-RTP AND AT DIFFERENT POINTS IN THE PLANNING CYCLE, (4) INVESTIGATE THE END-USES OF R
 AND D WORK AND ESTABLISH A SYSTEM FOR INFORMATION DISSEMINATION OUTSIDE THE LABORATORY CONSISTENT
 WITH THE MISSION AND RESOURCES OF IERL-

****PROJECT: 01577-WASTE HEAT UTILIZATION**

STARTING/ COMPLETION DATE : 05/75 - 09/80 : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=F624A-090 **EPA-D5-E721-BF ** (IAG) PRIOR FY76 / \$ 420000

EPA OFFICER.: JP CHASSE EPA/IERL - RTP
 INVESTIGATOR.: BJ BOND US TVA
 CE MADEWELL US TVA
 JJ MADDOX US TVA
 DA MAYS US TVA
 RS PILE US TVA
 L BEHRENDUS US TVA

MILESTONES.... 06/77 -COMPLETE CONSTRUCTION PILOT-SCALE PHYTOPLANKTON GROWTH SYSTEM
 06/78 -TESTING THE EFFECT OF HEAT IN PILOT-SCALE PHYTOPLANKTON SYSTEM
 12/78 -COMPLETE CONSTRUCTION OF PILOT-SCALE HEATED OUTDOOR SYSTEM
 12/78 -REPORT ON FIRST PHASE OF FISH-PHYTOPLANKTON SYSTEM
 12/79 -REPORT ON YEAR OF OPERATION OF PILOT-SCALE SYSTEM (ECONOMICS, BIO L
 12/79 -COMPLETE TESING OF FIRST PHASE OF CLAM-PLANKTON PRODUCTION SYSTEM

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES... RECN-001577 SSIE-GMA 2950 1 EPA -D5-E721-BF TASK-F624A-090
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... TASK I. SOIL HEATING TO EXTEND CROP GROWING SEASON--SPECIFIC OBJECTIVES ARE (1) HEATING SOIL TO
 EXTEND THE CROP GROWING SEASON, AND (2) IMPROVING PRODUCTION EFFICIENCY OF FIELD AND HORTICULTURAL
 CROPS. FIELD EXPERIMENTS WERE CONTINUED IN 1977 IN PLOTS OF SOIL HEATED BY WATER CIRCULATED THROUGH
 PLASTIC PIPES. WARMER WATER THAN USED PREVIOUSLY (43 TO 49 DEGREES C) RESULTED IN EARLY SPRING
 GROWTH RESPONSE BY SWEET CORN, SNAP BEANS, PEANUTS, AND CANTALOUPES WITH YIELD INCREASES OF PEANUTS
 AND CANTALOUPES. EXPERIMENTS WERE ALSO CONTINUED IN A PLASTIC GREENHOUSE WITH WARM WATER PIPED
 THROUGH THE SOIL AS THE SOLE SOURCE SUPPLEMENTING SOLAR HEAT. AIR TEMPERATURES REMAINED ABOVE
 FREEZING EXCEPT WITH OUTSIDE NIGHT TEMPERATURES BELOW -18 DEGREES C (0 DEGREES F). COLD SEASON
 VEGETABLE CROPS WERE GROWN SUCCESSFULLY IN MIDWINTER, BUT IT WAS NECESSARY TO DELAY PLANTING OF
 WARM SEASON CROPS UNTIL LATE FEBRUARY. TASK II. BIOLOGICAL RECYCLING OF NUTRIENTS FROM LIVESTOCK
 WASTES--SPECIFIC OBJECTIVES ARE: (1) DEVELOP A METHOD THAT USES WASTE HEAT FROM ELECTRIC POWER
 PLANT DISCHARGE WATER TO ENHANCE BIOLOGICAL RECYCLING OF PLANT NUTRIENTS FROM LIVESTOCK WASTE BY
 GROWING AQUATIC AND TERRESTRIAL PLANTS (2) INVESTIGATING THE USE OF FISH, CLAMS, AND/OR OTHER
 ANIMALS TO CONSUME THE PRODUCED PLANTS, AND (3) EVALUATING THE USE OF THESE PRODUCTS AS FEEDSTUFFS
 OR LIVESTOCK FEED SUPPLEMENTS. EXPERIMENTS HAVE BEEN CONDUCTED IN UNHEATED OPEN-AIR 8000-LITER TEST
 POOLS AND IN HEATED TANKS UNDER A PLASTIC COVERING. THE WATER IS HEATED BY RUNNING WARMED WATER
 THROUGH STAINLESS STEEL HEAT EXCHANGERS. SWINE MANURE WAS USED TO FERTILIZE "NATIVE" ALGAE AND
 OTHER PLANTS. ALGAE PRODUCTION HAS BEEN GOOD, BUT SIMULATED WASTE HEAT TEMPERATURES WERE OF LITTLE
 BENEFIT DURING SUMMER. PHYTOPHAGOUS FISH (SILVER CARP, BIGHEAD CARP, AND TILAPIA) HAVE HAD GOOD
 SURVIVAL AND HIGH GROWTH RATES WHEN FED ALGAE GROWN WITH SWINE MANURES. FURTHER TESTING WILL BE
 NECESSARY TO ASSESS THE BENEFIT OF WASTE HEAT DURING THE WINTER MONTHS.

****PROJECT: 01582-ADVANCED WASTE HEAT CONTROL**

STARTING/ COMPLETION DATE : 05/75 - 12/79 : FUNDING : ESTIMATED - FY77 / \$ 300000
 TASK CODE=F624A-098 **EPA=D5-E721-BE ** (IAG) PRIOR FY76 / \$ 1015000

EPA OFFICER.: JP CHASSE
 INVESTIGATOR.: HB FLORA
 HB FLORA
 US TVA
 US TVA

MILESTONES...: 06/79 -FEASIBILITY OF MEMBRANE TECHNOLOGY FOR POWER PLANT SYSTEMS
 12/79 -REPORT ON TESTING MECHANISMS TO REDUCE INTAKE STRUCTURE IMPACT
 06/79 -DEMONSTRATION OF WET/DRY COOLING TOWER TECHNOLOGY AND ENVIRONMENT AL

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION

ORDIS CODES...: REC-001582 SSIE-GMA 2942 1 EPA -D5-E721-BE TASK-F624A-098
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT TO (1) EVALUATE THE USE OF MEMBRANE PROCESSES, E.G. REVERSE OSMOSIS AND ULTRAFILTRATION, FOR REFURBISHING POWER PLANT DISCHARGE WATERS, (2) INVESTIGATE, EVALUATE, AND DETERMINE WHETHER ONE OR MORE MECHANISMS MAY BE BENEFICIAL IN REDUCING ENTRAINMENT AND/OR ENTRAINMENT, AND (3) EVALUATE THE ENGINEERING AND ENVIRONMENTAL ASPECTS OF WET/DRY COOLING TOWERS. THE APPROACH INCLUDES: (1) REVIEW OF AVAILABLE INFORMATION ALONG WITH LABORATORY STUDIES AND EVALUATION ON COMMERCIALLY AVAILABLE REVERSE OSMOSIS AND ULTRAFILTRATION MEMBRANES TO DETERMINE THEIR ABILITY TO REMOVE POWER PLANT WASTE STREAMS SUITABLE FOR RECYCLE OR REUSE, (2) REVIEW OF AVAILABLE INFORMATION AND BASIC STUDIES ON THE MOST PROMISING MECHANISMS TO REDUCE ENTRAINMENT AND/OR ENTRAINMENT, AND (3) STUDIES AND EVALUATIONS ON THE ENGINEERING AND ENVIRONMENTAL PROBLEMS ASSOCIATED WITH A PROTOTYPE WET/DRY COOLING TOWER. CURRENT PROGRESS HAS INCLUDED DEMONSTRATING THAT ONE TYPE OF MEMBRANE HAS PROMISE FOR REMOVING TRACE INORGANICS TO BELOW 1.0 MG/L ON ONE WASTE STREAM. FURTHER DEVELOPMENTS IN THE INTAKE STRUCTURE TASK HAVE LED TO THE DESIGN AND LABORATORY TESTING OF A SYSTEM TO REDUCE ENTRAINMENT BY FINE MESH SCREENING AND TO INCREASE THE POSSIBILITY OF SURVIVAL FOR IMPINGED FISH. ALSO, THE FULL-SCALE DEMONSTRATION WET/DRY COOLING TOWER HAS BEEN PROCURED. CURRENT PLANS INCLUDE PERFORMING ECONOMIC ANALYSES ON A MEMBRANE SYSTEM THAT CAN CONFORM TO THE SPECIFICATIONS OBTAINED IN THE LABORATORY PILOT TESTING. TESTING ON THE INTAKE STRUCTURE SYSTEM WILL CONTINUE. THE FULL-SCALE WET/DRY DEMONSTRATION WILL BE TESTED FOR APPROXIMATELY NINE MONTHS UNDER DIFFERENT OPERATING AND METEOROLOGICAL CONDITIONS.

****PROJECT: 01583-CHARACTERIZATION OF EFFLUENTS FROM COAL-FIRED UTILITY BOILERS**

STARTING/ COMPLETION DATE : 05/75 - 12/79 : FUNDING : ESTIMATED - FY77 / \$ 350000
 TASK CODE=F624A-100 **EPA=D5-E721-BB ** (IAG) PRIOR FY76 / \$ 1250000

EPA OFFICER.: JW JONES
 INVESTIGATOR.: HB FLORA
 HB FLORA
 US TVA
 US TVA

MILESTONES...: 12/78 -CHARACTERIZE COAL PILE DRAINAGE AND TREATMENT
 12/78 -ASSESSMENT OF PH ADJUSTMENT OF QUALITY OF ASH POND EFFLUENT
 08/78 -DESIGN OF AN EFFECTIVE ASH POND MONITORING PROGRAM
 12/78 -CHARACTERIZING CHLORINATED DISCHARGES AND OPTIMUM USAGE OF CHLORI NE
 10/78 -INFLUENCE OF ASH POND WATER ON GROUND WATER QUALITY
 12/79 -CHARACTERIZING EMISSIONS FROM DIFFERENT BOILERS
 12/79 -DEVELOP CONTROL TECHNOLOGY TO REMOVE TOXIC TRACE ORGANICS AND IND RG
 06/79 -VERIFY WATER CHEMISTRY MODEL FOR SPECIFIC WATER TREATMENT NEEDED

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION

ORDIS CODES...: REC-001583 SSIE-GMA 2944 1 EPA -D5-E721-BB TASK-F624A-100
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVES OF THIS PROJECT ARE TO (1) CHARACTERIZE AND QUANTIFY THE CHEMICAL AND PHYSICAL COMPONENTS OF COAL PILE DRAINAGE, (2) ASSESS AND QUANTIFY THE CHEMICAL AND PHYSICAL NATURE OF ASH POND EFFLUENT AFTER THE PH OF THE ASH POND HAS BEEN ADJUSTED TO MEET EXISTING STANDARDS, (3) EVALUATE AN ASH POND MONITORING PROGRAM TO DETERMINE THE SAMPLING NECESSARY TO OBTAIN RELIABLE, REPRESENTATIVE INFORMATION, (4) ASSESS AND CHARACTERIZE COAL ASH LEACHATE ON GROUND WATER, (5) EVALUATE AND QUANTIFY THE CHLORINATED EFFLUENT IN THE DISCHARGE CANAL OF A ONCE-THROUGH COOLING SYSTEM, (6) CHARACTERIZE THE GASEOUS AND PARTICULATE EMISSIONS FROM TWO PLANTS WITH DIFFERENT TYPE UNITS, E.G. CYCLONE AND TANGENTIAL-FIRED UNITS, (7) DEVELOP TECHNOLOGY TO REMOVE PRIORITY POLLUTANTS, AND (8) VERIFY WATER CHEMISTRY MODEL FOR SPECIFIC WATER TREATMENT NEEDED. CURRENT PROGRESS INCLUDES (1) COMPLETING FIELD AND LABORATORY STUDIES ON CHARACTERIZING AND TREATING COAL PILE DRAINAGE, (2) COMPLETING LABORATORY STUDIES ON EFFECT OF PH ADJUSTMENT ON THE QUALITY OF ASH POND DISCHARGE, (3) COMPLETING FIELD ASH POND MONITORING AND ASSESSMENT OF THE ABILITY OF THE MONITORING PROGRAM TO OBTAIN RELIABLE, REPRESENTATIVE DATA, (4) ASSESSMENT OF OPTIMUM CHLORINATION SCHEDULE TO MAINTAIN GENERATING UNIT THERMAL PERFORMANCE CONTINUES, (5) COMPLETING OF FIELD AND LABORATORY STUDIES ON QUALITY OF ASH POND LEACHATE, AND (6) COMPLETING FIELD STUDIES AND LABORATORY ANALYSES FOR CHARACTERIZING GASEOUS AND PARTICULATE EMISSIONS FROM DIFFERENT TYPES OF BOILERS. FUTURE PLANS ARE: PUBLISH MILESTONE REPORTS ON TASKS 1, 2, 3, 5, AND 6 ABOVE AND BEGIN WORK ON TASKS 7 AND 8.

****PROJECT: 01584-FLY ASH CHARACTERIZATION AND DISPOSAL AND STUDYING WATER REUSE OR RECYCLING**

STARTING/ COMPLETION DATE : 06/75 - 12/79 : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=F624A-102 **EPA=D6-E721-BC ** (IAG) PRIOR FY76 / \$ 410000

EPA OFFICER.: JW JONES EPA/IERL - RTP
 INVESTIGATOR.: SS RAY US TVA
 SS RAY US TVA

MILESTONES....: 12/76 -SUMMARY OF DATA ON COAL AND ASH CHARACTERIZATION
 10/79 -PROPERTIES OF COAL, ASH, AND ASH EFFLUENT
 12/78 -SUMMARY OF METHODS OF DISPOSAL AND UTILIZATION OF FLY ASH REPORT
 06/79 -EVALUATION OF WET AND DRY FLY ASH HANDLING SYSTEMS REPORT
 06/79 -REPORT ON PROCESSES FOR REUSING OR RECYCLING WASTEWATER STREAMS

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001584 SSIE-GMA 2946 1 EPA -D6-E721-BC TASK-F624A-102
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: THE PURPOSES OF THIS PROJECT ARE TO CHEMICALLY AND PHYSICALLY CHARACTERIZE ASHES AND THEIR WASTE EFFLUENTS AND TO EXAMINE FLY ASH HANDLING SYSTEMS, DISPOSAL AND UTILIZATION METHODS, AND TREATMENT METHODS FOR WATER REUSE. MASS BALANCES AROUND SEVERAL FACILITIES HAVING DIFFERENT BOILER SYSTEMS AND COALS MAY BE INCORPORATED TO DETERMINE THE DIFFERENCE IN ASH AND EFFLUENT CHARACTERISTICS WITH VARIATION IN BOILER DESIGN, OPERATION, OR COAL TYPE. THE SCOPE OF THIS PROJECT INCLUDES SUMMARIZING AVAILABLE INFORMATION ON ASHES AND EFFLUENTS, WET AND DRY HANDLING SYSTEMS, DISPOSAL AND UTILIZATION OF FLY ASH, AND METHODS OF TREATMENT FOR WATER REUSE; CHARACTERIZING ASHES AND EFFLUENTS OF SEVERAL PLANTS; STUDIES ON DISPOSAL ALTERNATIVES AND SPECIFIC ASH PROBLEMS; AND STUDIES ON PROCESSES FOR REUSING OR RECYCLING WASTEWATER STREAMS FROM COAL-FIRED POWER PLANTS. A REPORT, "CHARACTERIZATION OF ASH FROM COAL-FIRED POWER PLANTS," WAS COMPLETED AND DISTRIBUTED. SAMPLING PROGRAMS TO DETERMINE MASS BALANCES AROUND THE UNITS HAVE BEEN CONDUCTED AT TWO TVA STEAM PLANTS. IN OCTOBER, 1975, A THREE-DAY PRELIMINARY STUDY WAS CONDUCTED TO TEST PROCEDURES. EQUIPMENT, AND PERSONNEL AT A WALL-FIRED UNIT OF COLBERT STEAM PLANT. IN AUGUST, 1976, AN EIGHT-DAY SAMPLING PROGRAM WAS CONDUCTED ON THE SAME UNIT. SAMPLING POINTS WERE THE COAL SCALES, PULVERIZER, MECHANICAL COLLECTOR AND ELECTROSTATIC PRECIPITATOR ASH HOPPERS, PYRITE HOPPER, INFLOW WATER, AND SLUICE WATERS FOR FLY ASH, BOTTOM ASH, AND PYRITES. FOR THE SECOND STUDY THE GAS STREAM, BOTH BEFORE AND AFTER THE ELECTROSTATIC PRECIPITATOR, WAS SAMPLED IN ADDITION. THESE SAMPLES HAVE NOW BEEN CHEMICALLY AND PHYSICALLY ANALYZED. IN JULY 1977 A SIMILAR STUDY WAS CONDUCTED AT A TANGENTIALLY FIRED UNIT OF KINGSTON STEAM PLANT. PLANS FOR THIS FISCAL YEAR ARE TO CHEMICALLY AND PHYSICALLY ANALYZE THE SAMPLES FROM THE KINGSTON STEAM PLANT STUDY; TO COMPLETE A MILESTONE REPORT ON RESULTS OF THE COLBERT STEAM PLANT STUDY; TO SUMMARIZE METHODS OF TREATMENT FOR WATER REUSE; TO SUMMARIZE METHODS FOR DISPOSAL AND UTILIZATION OF FLY ASH; AND TO STUDY PROCESSES FOR REUSING OR RECYCLING WASTEWATER STREAMS FR

****PROJECT: 01588-AIR POLLUTION EMISSION CONTROL DEVELOPMENT FOR STATIONARY INTERNAL COMBUSTION ENGINES**

STARTING/ COMPLETION DATE : 10/77 - 10/80 : FUNDING : ESTIMATED - FY77 / \$ 300000
 TASK CODE=F624A-11 **EPA=68-02-2664 ** (CNTR.) PRIOR FY76 / \$ 120076

EPA OFFICER.: JH WASSER EPA/IERL - RTP
 INVESTIGATOR.: UNKNOWN ARTHUR D. LITTLE INC

MILESTONES....: 10/77 -PROJECTED START OF CONTRACT
 02/77 -COMPLETE DESIGN CONCEPT DEVELOPMENT
 10/78 -COMPLETE DESIGN CONCEPT ANALYSIS AND SELECTION
 02/80 -COMPLETE EXPERIMENTAL RESEARCH ON SELECTED DESIGN CONCEPTS
 10/80 -COMPLETE DEVELOPMENT PROGRAM FOR SUCCESSFUL CONCEPTS

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001588 SSIE-GMA 4687 EPA -68-02-2664 TASK-F624A-11
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: THIS PROGRAM WILL DEVELOP A SET OF COMBUSTION CHAMBER DESIGN CONCEPTS FOR RECIPROCATING ENGINES FROM A COMPILATION OF ALL AVAILABLE PRIOR ANALYTICAL AND EXPERIMENTAL INFORMATION AND FROM THE CONTRACTOR'S FURTHER THOROUGH ASSESSMENT OF THE RECIPROCATING COMBUSTION PROCESS. THE SET OF DESIGN CONCEPTS WILL BE STUDIED AND A SELECTION PROCESS ESTABLISHED TO IDENTIFY THE MOST PROMISING CONCEPTS UTILIZING MATHEMATICAL MODELING AND/OR OTHER TECHNIQUES FOR PREDICTION OF EMISSIONS PERFORMANCE. DESIGN CONCEPTS WILL THEN BE IMPLEMENTED AND TESTED IN AN EXPERIMENTAL FACILITY CAPABLE OF DUPLICATING LARGE BORE RECIPROCATING ENGINES. BASED ON THE EVALUATION OF THE TEST RESULTS, THE BEST DESIGN CONCEPTS WILL BE INCORPORATED IN FULL SCALE ENGINES TO DEVELOP THE OPTIMUM CONFIGURATION AND OPERATING CONDITIONS FOR APPLICATION IN BOTH

****PROJECT: 01617-INTEGRATED ASSESSMENT OF COAL-BASED ENERGY TECHNOLOGIES, PHASE II**

STARTING/ COMPLETION DATE : 09/77 - 09/80 : FUNDING : ESTIMATED - FY77 / \$ 150000
 TASK CODE=F624A-78 **EPA=68-02-2672 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: RP HANSEN
 INVESTIGATOR.: UNKNOWN EPA/IERL - RTP
 MILESTONES...: 09/77 -CONTRACT AWARD BATTTELLE MEMORIAL INST
 00/00 -PERIODIC REPORTS AND PRESENTATIONS OF INTERIM RESULTS
 09/80 -PROJECT COMPLETE
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001617 SSIE-GMA 4686 EPA -68-02-2672 TASK-F624A-7B
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES: TO IDENTIFY, DESCRIBE, COMPARE, AND QUANTIFY WHERE POSSIBLE THE RANGE AND MAGNITUDE OF BIOPHYSICAL, SOCIO-ECONOMIC, AND ENERGY IMPACTS OF ALTERNATIVE MIXES, RATES, LEVELS, AND TIMING OF THE DEVELOPMENT AND DEPLOYMENT OF COAL-BASED ENERGY TECHNOLOGIES, SUPPLY SYSTEMS, AND END USES; TO IDENTIFY AND COMPARATIVELY ANALYZE TECHNOLOGICAL AND INSTITUTIONAL METHODS OF AVOIDING OR MITIGATING UNDESIRABLE IMPACTS; AND TO RECOMMEND ALTERNATIVE POLICIES THAT WILL ACHIEVE THE BEST BALANCE OF ENVIRONMENTAL QUALITY, ENERGY EFFICIENCY, ECONOMIC COSTS, AND SOCIAL BENEFITS, AND TO PROPOSE STRATEGIES FOR POLICY IMPLEMENTATION. APPROACH: INTEGRATE THE RESULTS OF COMPLETED AND ONGOING EPA/IERL "ENVIRONMENTAL ASSESSMENTS" OF COAL-BASED ENERGY AND ENVIRONMENTAL CONTROL TECHNOLOGIES; CONDUCT A COMPARATIVE ASSESSMENT OF THE ENVIRONMENTAL, SOCIAL, ECONOMIC, AND ENERGY IMPACTS OF COAL-BASED ENERGY TECHNOLOGIES, SUPPLY SYSTEMS, AND END USES; ASSESS NATIONAL IMPACTS FOR ALL COMPONENTS FOR COAL-ENERGY SUPPLY SYSTEMS; EXTRACTION; FUEL STOCK TRANSPORTATION; PROCESSING; CONVERSION; ENERGY PRODUCT TRANSPORTATION AND END USE; IDENTIFY, ANALYZE, AND COMPARE TECHNOLOGICAL AND INSTITUTIONAL METHODS OF AVOIDING OR MITIGATING UNDESIRABLE CONSEQUENCES OF COAL-ENERGY DEVELOPMENT; AND IDENTIFY AND EVALUATE ALTERNATIVE POLICIES AND IMPLEMENTATION STRATEGIES. CURRENT PROGRESS: PHASE I, THE PROJECT DEFINITION PHASE, WAS CONTRACTED TO BATTELLE COLUMBUS LABORATORIES, RADIAN CORPORATION, AND STANFORD RESEARCH INSTITUTE WHO STARTED WORK ON 1/5/77 AND SUBMITTED WORK PLANS FOR PHASE II, THE INTEGRATED ASSESSMENT, ON 7/5/77. ONE OF THESE THREE CONTRACTORS WILL BE SELECTED FOR PHASE II TO COMMENCE ON OR ABOUT 9/30/77.

****PROJECT: 04012-PROCESSING SLUDGES FROM LIME/LIMESTONE WET SCRUBBING PROCESSES FOR DISPOSAL OR RECYCLE (ABBREV)**

STARTING/ COMPLETION DATE : 07/75 - 03/80 : FUNDING : ESTIMATED - FY77 / \$ 200000
 TASK CODE=V624A-14 **EPA=D6-E721-BA ** (IAG) PRIOR FY76 / \$ 350000
 EPA OFFICER.: WN MCCARTHY EPA/HQOTRS- OEMT
 INVESTIGATOR.: JL CROWE US TVA
 MILESTONES...: 10/76 -MILESTONE REPORT ON SLUDGE-SCRUBBER CORRELATION
 10/77 -FINAL REPORT ON SLUDGE-SCRUBBER CORRELATION
 10/77 -FINAL REPORT ON FBC WASTE CHARACTERIZATION
 10/78 -FINAL REPORT ON SLUDGE-FERTILIZER STUDY
 10/79 -FINAL REPORT ON REVEGETATION STUDY
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-004012 SSIE-GMA 2941 1 EPA -D6-E721-BA TASK-V624A-14
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVES OF THIS PROGRAM ARE AS FOLLOWS: (1) TO DEFINE THE VARIABLES IN PILOT PLANT PRODUCTION OF FERTILIZER FROM SCRUBBER PRODUCT SLUDGE, TO STUDY THE COMPATIBILITY FACTORS INVOLVED IN STORAGE AND MIXING OF THIS FERTILIZER MATERIAL WITH CONVENTIONAL FERTILIZER, TO ANALYZE FOR TRACE ELEMENTS AND POTENTIAL TOXIC SPECIES IN THIS TYPE OF FERTILIZER, AND TO DETERMINE THE MARKETING AND PRODUCTION COST OF THIS TYPE OF MATERIAL; (2) TO DETERMINE THE RANGE OF VARIABILITY OF SOLIDS IN SLUDGES PRODUCED FROM THE SHAWNEE SCRUBBERS AND TO CORRELATE THIS VARIABILITY WITH PLANT AND SCRUBBER OPERATING CONDITIONS; (3) TO PROVIDE A DETAILED CHEMICAL AND PHYSICAL CHARACTERIZATION OF WASTE BED MATERIAL PRODUCED BY FLUIDIZED-BED COMBUSTORS AND AN EVALUATION OF DISPOSAL METHODS FOR THIS MATERIAL; (4) TO IDENTIFY THE LIMITING FACTORS IN COMBINING VARIOUS WASTES WITH SCRUBBER SLUDGES IN ADMIXTURES WHICH WILL SUPPORT VEGETATION AND IN TURN CAN BE UTILIZED TO RECLAIM WASTE DISPOSAL SITES. CURRENTLY, THE CHARACTERIZATION STUDIES OF SLUDGES OBTAINED FROM SHAWNEE ARE ONGOING AND DATA IS BEING STATISTICALLY ANALYZED. CHARACTERIZATION OF WASTE SOLIDS PRODUCED BY THE FLUIDIZED-BED COMBUSTION PROCESS IS ALSO IN PROCESS. OPERATION OF THE PILOT SCALE PRENEUTRALIZER AND THE PILOT PLANT GRANULATION UNIT IS SCHEDULED TO BEGIN DURING THE TRANSITION PERIOD. FOLLOWING ATTAINMENT OF STEADY-STATE OPERATION, PRODUCTION WILL BEGIN TO PRODUCE A FERTILIZER FOR STORAGE, COMPATIBILITY, AND AGRONOMIC TESTING. STUDIES TO DEVELOP TECHNIQUES FOR REVEGETATION OF SO2 WASTE DISPOSAL PONDS ARE ALSO IN PROCESS AND HAVE PRODUCED GO

****PROJECT: 00432-IERL-CI TECHNICAL SUPPORT CONTRACT**

STARTING/ COMPLETION DATE : 09/77 - 09/79 : FUNDING : ESTIMATED - FY77 / \$ 158000
TASK CODE=B624B-POO **EPA=68-03-2609 ** (CNTR.) PRIOR FY76 /
EPA OFFICER.: C DIAL EPA/IERL - CINC
INVESTIGATOR.: AD ABBOTT AEROSPACE CORP
MILESTONES...: 09/77 -AWARD CONTRACT
09/79 -TERMINATE CONTRACT
PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
ORDIS CODES...: RECN-000432 SSIE-GMA 4620 EPA -68-03-2609 TASK-B624B-POO
AP -624B DU -L110 LABT-EMI
ABSTRACT.....: THIS IS A TECHNICAL SUPPORT CONTRACT WHICH WILL PROVIDE FOR GATHERING OF DATA AND THE CONDUCT OF
ANALYSES WHICH CAN BE USED BY LABORATORY MANAGEMENT WHEN THEY SET OBJECTIVES OR DETERMINE RESOURCE
REQUIREMENTS AND METHODS FOR IMPLEMENTATION OF PROGRAMS, AND MECHANISMS TO ENSURE A TIMELY FLOW OF
TECHNICAL PROGRAMMATIC INFORMATION.

****PROJECT: 00437-PROCESS EVALUATION - MULTI-WASTE GASIFICATION**

STARTING/ COMPLETION DATE : 09/77 - 12/77 : FUNDING : ESTIMATED - FY77 / \$ 25000
TASK CODE=B624B-T11 **EPA=68-03-2550 ** (CNTR.) PRIOR FY76 /
EPA OFFICER.: WW LIBERICK EPA/IERL - CINC
INVESTIGATOR.: WH HEDLEY MONSANTO RESEARCH CORP
MILESTONES...: 07/77 -FUNDING PACKAGE SUBMITTED
09/77 -AWARD FUNDS FOR PROJECT
11/77 -DRAFT FINAL REPORT
12/77 -FINAL REPORT RECEIVED
PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
ORDIS CODES...: RECN-000437 SSIE-GMA 3678 EPA -68-03-2550 TASK-B624B-T11
AP -624B DU -L110 LABT-EMI
ABSTRACT.....: THE OBJECTIVE OF THIS EFFORT IS TO DO A COMPLETE ENVIRONMENTAL, ECONOMIC, AND TECHNICAL FEASIBILITY
OF A MULTI-WASTE GASIFICATION SYSTEM. IT IS ENVISIONED THAT SUCH A SYSTEM WOULD BE ADJACENT TO AN
EXISTING GAS, LIQUID, OR SOLID FUEL USER AND WOULD MARKET ITS GAS PRODUCT TO SUCH A USER.
ACCEPTABLE WASTE TYPES INCLUDE: MUNICIPAL SOLID WASTE, SEWAGE SLUDGES, INDUSTRIAL (HAZARDOUS,
SLUDGES, ETC.) AND AGRICULTURAL WASTES. THE CONTRACTOR'S APPROACH SHALL BE TO UTILIZE HIS
EXPERIENCE, THE LITERATURE, AND EXISTING DATA FROM GASIFICATION PROCESS DEVELOPERS TO COMPLETE THIS
ASSESSMENT (I.E., UNION CARBIDE, ERCO, PRINCETO

****PROJECT: 00440-PROCESS EVALUATION - MULTI-WASTE CO-FIRING IN UTILITY BOILERS**

STARTING/ COMPLETION DATE : 09/77 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 50000
TASK CODE=B624B-T24 **EPA=68-03-2552 ** (CNTR.) PRIOR FY76 /
EPA OFFICER.: RA OLEXSEY EPA/IERL - CINC
INVESTIGATOR.: GR SMITHSON BATTELLE MEMORIAL INST
MILESTONES...: 09/77 -AWARD
05/78 -FINAL REPORT
PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
ORDIS CODES...: RECN-000440 SSIE-GMA 4390 EPA -68-03-2552 TASK-B624B-T24
AP -624B DU -L110 LABT-EMI
ABSTRACT.....: THIS TASK CALLS FOR A PRELIMINARY, "PAPER STUDY" TYPE ASSESSMENT OF THE POTENTIAL FOR THE USE OF A
VARIETY OF WASTE MATERIALS IN CONJUNCTION WITH MUNICIPAL SOLID WASTE (MSW) AS COMBUSTION FUELS FOR
UTILITY BOILERS. WASTE MATERIALS TO BE INVESTIGATED SHALL INCLUDE MUNICIPAL SEWAGE SLUDGES,
INDUSTRIAL SLUDGES, WASTE OILS AND LUBRICANTS, INDUSTRIAL WASTES, COMMERCIAL WASTES, INSTITUTIONAL
WASTES, AND WOOD WASTES. THE STUDY WILL FOCUS ON THE TECHNICAL FEASIBILITY OF COFIRING THE VARIOUS
WASTES WITH COAL, OIL, MSW, AND OTHER LISTED WASTES. THE STUDY WILL ALSO GENERALLY ADDRESS THE
ECONOMIC FEASIBILITY OF COFIRING THE VARIOUS WASTES AND WILL INCLUDE A DISCUSSION OF THE LOGISTICAL
PROBLEMS THAT PRESENTLY CAN BE IDENTIFIED.

****PROJECT: 00450-REFUSE DERIVED FUEL SOURCES AND UTILIZATION**

STARTING/ COMPLETION DATE : 08/77 - 11/77 : FUNDING : ESTIMATED - FY77 / \$ 25000
TASK CODE=B624B-T61 **EPA=68-03-2563 ** (CNTR.) PRIOR FY76 /
EPA OFFICER.: WW LIBERICK EPA/IERL - CINC
INVESTIGATOR.: AD MCLEROY MIDWEST RES INST TECH ECON SECTION
MILESTONES...: 08/77 -FUNDING PACKAGE SUBMITTED
10/77 -AWARD FUNDS FOR PROJECT
00/00 -DRAFT FINAL REPORT
11/77 -FINAL REPORT RECEIVED
PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
ORDIS CODES...: RECN-000450 SSIE-GMA 3679 EPA -68-03-2563 TASK-B624B-T61
AP -624B DU -L110 LABT-EMI
ABSTRACT.....: THE OBJECTIVE OF THIS STUDY IS TO IDENTIFY SOURCES OF FEEDSTOCKS (WASTES) COMPATIBLE WITH EXISTING
WASTE-AS-FUEL PROCESSES AND "PRODUCT" FUEL USERS. THIS EFFORT CALLS FOR A NATIONAL IDENTIFICATION
OF WASTE SOURCES (MUNICIPAL, INDUSTRIAL, AGRICULTURAL/QUANTITIES AND LOCATIONS BY COUNTIES) AND
CURRENT FUEL USERS (RESIDENTIAL, UTILITY BOILERS, ETC. AND LOCATIONS BY COUNTIES). IT IS ENVISIONED
THAT THE RESULTS OF THIS EFFORT WILL BE DISPLAYED IN A TABULAR FORM ACCORDING TO GEOGRAPHIC AREAS
AS WELL AS DISPLAYED ON ONE OR A SERIES OF MAPS.

****PROJECT: 00453-SYSTEM CONCEPT EVALUATION - DENSIFIED REFUSE - DERIVED FUELS**

STARTING/ COMPLETION DATE : 09/77 - 04/78 : FUNDING : ESTIMATED - FY77 / \$ 21000
 TASK CODE=B624B-T72 **EPA-68-03-2568 ** (CNTR.) PRIOR FY76 /
 EPA OFFICER.: RA OLEXSEY EPA/IERL - CINC
 INVESTIGATOR.: M ZEITOUN DOW CHEMICAL CO
 MILESTONES...: 09/77 -AWARD
 04/78 -FINAL REPORT
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: RECN-000453 SSIE-GMA 4393 EPA -68-03-2568 TASK-B624B-T72
 AP -624B DU -L110 LABT-EMI
 ABSTRACT.....: THIS TASK CALLS FOR AN ECONOMIC AND TECHNICAL FEASIBILITY STUDY OF THE CONCEPT OF CENTRAL STATION
 PRODUCTION OF DENSIFIED REFUSE DERIVED FUEL (DRDF), MARKETING, AND DELIVERY OF THE FUEL PRODUCT TO
 INDUSTRIAL, INSTITUTIONAL, AND UTILITY BOILERS WITHIN THE LOCAL VICINITY OF THE CENTRAL STATION
 PLANT. COSTS AND THE FEASIBILITY OF THE DRDF SYSTEM CONCEPT WILL BE COMPARED/CONTRASTED WITH THOSE
 OF THE MORE CONVENTIONAL CONCEPT OF THE PRODUCTION OF "FLUFF" REFUSE DERIVED FUEL (RDF) FOR SALE TO
 AN ADJACENT UTILITY. THE CONTRACTOR WILL USE HIS EXPERIENCE, THE LITERATURE, AND EXISTING DATA
 SUPPLIED BY SYSTEM DEVELOPERS AND EPA THROUGH CONTRACTORS AND GRANTEEES WORKING ON THE SUBJECT AREA.

****PROJECT: 00454-PROCESS EVALUATION - CHINA LAKE PYROLYSIS SYSTEM**

STARTING/ COMPLETION DATE : 09/77 - 02/78 : FUNDING : ESTIMATED - FY77 / \$ 25000
 TASK CODE=B624B-T73 **EPA-68-03-2568 ** (CNTR.) PRIOR FY76 /
 EPA OFFICER.: WW LIBERICK EPA/IERL - CINC
 INVESTIGATOR.: M ZEITOUN DOW CHEM CO
 MILESTONES...: 09/77 -AWARD
 02/78 -FINAL REPORT
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: RECN-000454 SSIE-GMA 4613 EPA -68-03-2568 TASK-B624B-T73
 AP -624B DU -L110 LABT-EMI
 ABSTRACT.....: THIS TASK CALLS FOR A COMPLETE ENVIRONMENTAL, ECONOMIC, AND TECHNICAL FEASIBILITY STUDY OF A
 PYROLYSIS, GAS CLEANING, AND THERMAL POLYMERIZATION PROCESS (TAKING WASTE ALL THE WAY TO GASOLINE)
 DEVELOPED AT THE NAVAL WEAPONS RESEARCH CENTER, AT CHINA LAKE, CALIFORNIA.

****PROJECT: 00455-ENVIRONMENTAL ASSESSMENT OF ENERGY CONSERVATION TECHNOLOGY**

STARTING/ COMPLETION DATE : 10/77 - 02/79 : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=B624B-373 **EPA-68-03-2198 ** (CNTR.) PRIOR FY76 / \$ 320000
 EPA OFFICER.: RE MOURNIGHAN EPA/IERL - CINC
 INVESTIGATOR.: UNKNOWN ARTHUR D. LITTLE INC
 MILESTONES...: 06/76 -FUNDING PACKAGE SUBMITTED
 10/77 -AWARD FUNDS FOR PROJECT
 03/77 -FUNDING INCREMENT
 02/79 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: RECN-000455 SSIE-GMA 4689 EPA -68-03-2198 TASK-B624B-373
 AP -624B DU -L110 LABT-EMI
 ABSTRACT.....: AN ASSESSMENT OF THE IMPACTS ON AIR QUALITY OF THE IMPLEMENTATION OF SOLAR ENERGY AND VARIOUS ENERGY
 CONSERVATION MEASURES AND TECHNOLOGIES IN SELECTED AIR QUALITY CONTROL REGIONS (AQCR'S) WILL BE
 CONDUCTED. THE STUDY WILL CONCENTRATE ON INDUSTRIAL APPLICATIONS, BUT WILL NOT BE LIMITED TO THIS
 AREA. THE CONVENTIONAL UTILITY INDUSTRY WILL BE EXCLUDED, HOWEVER. PROJECTIONS OF POSSIBLE ENERGY
 CONSERVATION AND SOLAR ENERGY APPLICATIONS IN THREE AQCR'S AND THE IMPACT ON AIR QUALITY WILL BE
 DEVELOPED. THE OUTPUT WILL CONSIST OF SCENARIOS DESCRIBING HOW ENERGY CONSERVATION MEASURES AND
 SOLAR ENERGY APPLICATIONS CAN IMPROVE AMBIENT AIR QUALITY IN TYPICAL AQCR'S WHERE AMBIENT AIR
 QUALITY STANDARDS (AAQS) ARE BEING EXCEEDED AND AN ASSESSMENT OF THE FEASIBILITY OF SUCH
 TECHNOLOGIES.

****PROJECT: 00458-FULL-SCALE DEMONSTRATION OF HYPERFILTRATION FOR CLOSED-CYCLE OPERATION
IN TEXTILE**

STARTING/ COMPLETION DATE : 06/77 - 04/81 : FUNDING : ESTIMATED - FY77 / \$ 190000
TASK CODE=B624B-374 **EPA=S805182-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: R MOURNIGHAN EPA/IERL - CINC
INVESTIGATOR.: CA BRANDON RIEGEL TEXTILE CORP
JE BOSTIC RIEGEL TEXTILE CORP
RK TEED RIEGEL TEXTILE CORP
JJ PORTER RIEGEL TEXTILE CORP

MILESTONES...: 05/77 -FUNDING PACKAGE SUBMITTED
09/77 -AWARD FUNDS FOR PROJECT
09/79 -COMPLETE CONSTRUCTION AND BEGIN OPERATION
09/80 -OPERATION COMPLETE
12/80 -DRAFT REPORT
04/81 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
ORDIS CODES...: RECN-000456 SSIE-GMA 4715 EPA -S805182-01 TASK-B624B-374
AP -624B DU -L110 LABT-EMI

ABSTRACT.....: THIS IS ONE OF A MULTI-PART PROJECT WHOSE SUMMARY MAY BE IDENTICAL TO OTHERS. THE OBJECTIVES OF THIS PROJECT ARE TO DEMONSTRATE THE ECONOMIC AND TECHNICAL ADVANTAGES TO A FULL SCALE REVERSE OSMOSIS (HYPERFILTRATION) SYSTEM FOR CLOSED CYCLE OPERATION OF A TEXTILE DYING AND FINISHING PLANT. INVOLVED IS THE DESIGN, INSTALLATION, AND TWELVE-MONTH OPERATION OF A REVERSE OSMOSIS TREATMENT SYSTEM FOR THE HOT WASTEWATER FROM EITHER A CONTINUOUS DYE RANGE OR A GROUP OF TEN ATMOSPHERIC DYE BECKS. THE TWO TYPES OF EQUIPMENT ARE TYPICAL OF THE TWO BROAD CATEGORIES OF TEXTILE PROCESSING: CONTINUOUS AND BATCH. A CONCEPTUAL DESIGN WILL BE DEVELOPED FOR EACH PROCESS AND THE ONE APPEARING TO BE THE MOST ECONOMICALLY VIABLE WILL BE DEMONSTRATED. OUTPUTS FROM THIS PROGRAM CONSIST OF: A DETAILED DESIGN FOR TEXTILE WASTEWATER TREATMENT BY REVERSE OSMOSIS, DETAILED OPERATIONS AND CAPITAL COSTS, DOCUMENTATION OF ENERGY SAVINGS OF THE REVERSE OSMOSIS SYSTEM COMPARED TO CONVENTIONAL WASTE TREATMENT METHODS AND EVALUATION OF CHEMICAL (DYES, SALT) RECYCLE IN THE DYING PROCESS.

****PROJECT: 00458-ENVIRONMENTAL ASSESSMENT OF ADVANCED ENERGY CONVERSION TECHNOLOGIES**

STARTING/ COMPLETION DATE : 04/76 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 100000
TASK CODE=B624B-379 **EPA-68-02-2146 ** (CNTR.) PRIOR FY76 / \$ 442000

EPA OFFICER.: WC CAIN EPA/IERL - CINC
INVESTIGATOR.: H SHAW EXXON RESEARCH & ENGINEERING CO
GS ARGYROPOULOS MIT
CJ KAU ULTRASYSTEMS INC

MILESTONES...: 03/75 -FUNDING PACKAGE SUBMITTED
04/76 -AWARD FUNDS FOR PROJECT
02/78 -PRELIMINARY ANALYSIS REPORT
03/79 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
ORDIS CODES...: RECN-000458 SSIE-GMA 2765 1 EPA -68-02-2146 TASK-B624B-379
AP -624B DU -L110 LABT-EMI

ABSTRACT.....: THE POTENTIAL ENVIRONMENTAL IMPACT OF ADVANCED ENERGY CONVERSION TECHNOLOGIES WILL BE ASSESSED IN A 4-PHASE PROGRAM OVER THE NEXT THREE YEARS IN ORDER TO AVOID THE NEED FOR RETROFITTING CONTROL EQUIPMENT WHEN THESE PLANTS ARE A COMMERCIAL REALITY. THE ADVANCED CYCLES TO BE CONSIDERED IN THIS PROGRAM INCLUDE: OPEN- AND CLOSED-CYCLE MAGNETOHYDRODYNAMICS (MHD), OPEN- AND CLOSED-CYCLE HIGH-TEMPERATURE GAS TURBINES, LIQUID METAL TOPPING CYCLES, SUPERCRITICAL CO2 CYCLES (FEHER), THERMIONICS, FUEL CELLS, ADVANCED STEAM CYCLES (FIELD), AND BOTTOMING CYCLES. THE PHASE I EFFORT WILL CONSOLIDATE THE AVAILABLE INFORMATION ON THE POTENTIAL POLLUTANTS AS WELL AS THE CURRENT STATE OF DEVELOPMENT OF ADVANCED CONVERSION TECHNOLOGIES. THE OBJECTIVE OF PHASE II WILL BE TO DEVELOP REALISTIC AND PRACTICAL ANALYTICAL MODELS IN ORDER TO ESTIMATE EFFLUENTS, POLLUTANTS, AND WASTE ENERGY. THESE MODELS WILL BE EMPLOYED TO PROVIDE PARAMETRIC ANALYSES OF EMISSION LEVELS RELATED TO CYCLE CHARACTERISTICS AND EFFICIENCY. THE COST-EFFECTIVENESS OF EXISTING POLLUTION CONTROL TECHNOLOGIES FOR EACH CYCLE WILL THEN BE DETERMINED. THE PHASE III FIELD AND LABORATORY TESTING EFFORT WILL BE CAREFULLY DESIGNED TO PROVIDE A PRELIMINARY ENVIRONMENTAL ASSESSMENT OF EACH CYCLE TESTED. SUFFICIENT DATA WILL BE OBTAINED TO FILL IN THE CRITICAL DATA GAPS AND THUS CALIBRATE AND VALIDATE THE CYCLE MODELS. PHASE IV OF THE PROGRAM WILL USE ALL THE INFORMATION AND DATA GENERATED IN THE PROGRAM TO IDENTIFY THE CRITICAL R&D NEEDED TO MAKE THESE TECHNOLOGIES ENVIRONMENTALLY ACCEPTABLE. THE IMPACT OF POLLUTION CONTROL ON ENERGY CONVERSION EFFICIENCY WILL BE STRESSED IN THE RECOMMENDATION. THIS PLANNING EFFORT WILL INCLUDE ALTERNATE R&D STRATEGIES AND PRIORITIES BASED ON ANTICIPATED RANGES OF AVAILABLE FUNDING.

****PROJECT: 00480-SURVEY OF GEOTHERMAL ENVIRONMENTAL REGULATIONS AND CONTROL TECHNOLOGY**

STARTING/ COMPLETION DATE : 11/75 - 06/77 : FUNDING : ESTIMATED - FY77 / \$ 16000
 TASK CODE=B624B-380 **EPA=68-03-2371 ** (CNTR.) PRIOR FY76 / \$ 98000
 EPA OFFICER.: R HARTLEY EPA/IERL - CINC
 INVESTIGATOR.: DB BOIES W A P O R A INC
 MILESTONES.... 11/75 -FUNDING PACKAGE SUBMITTED
 11/75 -AWARD FUNDS FOR PROJECT
 04/76 -INTERIM DRAFT REPORT ON REGULATIONS
 03/77 -DRAFT FINAL REPORT
 06/77 -FINAL REPORT RECEIVED
 PLAN ID..... (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES... RECN-000460 SSIE-GMA 3140 1 EPA -68-03-2371 TASK-B624B-380
 AP -624B DU -L110 LABT-EMI
 ABSTRACT..... ONE OF THE PROJECT OBJECTIVES (PHASE I) IS TO SUMMARIZE AND ANALYZE THE ADEQUACY OF FEDERAL, STATE AND LOCAL ENVIRONMENTAL LAWS APPLICABLE TO GEO-THERMAL ENERGY DEVELOPMENT. ANOTHER OBJECTIVE (PHASE II) IS TO EXAMINE THE CHARACTERISTICS AND POTENTIAL USES OF THE KNOWN GEOTHERMAL RESOURCE AREAS, POTENTIAL POLLUTION PROBLEMS, CONTROL TECHNOLOGIES, AND POLLUTION CONTROL RESEARCH NEEDS. THE APPROACH HAS BEEN TO EXAMINE AND ANALYZE EXISTING INFORMATION FROM MANY SOURCES. THE OUTPUT IS TO REPORTS, PHASE I (REGULATIONS) AND PHASE II (GEOTHERMAL RESOURCE AREA CHARACTERISTICS AND POTENTIAL PROBLEMS). THE TWO DOCUMENTS SHOULD BE USEFUL TO THOSE ENGAGED IN PREPARING IMPACT STATEMENTS, TO REGULATORS, TO LEGISLATIVE BODIES, AND TO GEOTHERMAL AREA DECISION-MAKERS.

****PROJECT: 00481-PRELIMINARY ENVIRONMENTAL ASSESSMENT OF SOLAR ENERGY SYSTEMS**

STARTING/ COMPLETION DATE : 12/75 - 02/77 : FUNDING : ESTIMATED - FY77 / \$ 2000
 TASK CODE=B624B-383 **EPA=68-02-1331 ** (CNTR.) PRIOR FY76 / \$ 15000
 EPA OFFICER.: R HARTLEY EPA/IERL - CINC
 INVESTIGATOR.: DR SEARS LOCKHEED MIS. & SPACE CO INC
 MILESTONES.... 12/75 -FUNDING PACKAGE SUBMITTED
 01/76 -AWARD FUNDS FOR PROJECT
 04/76 -DRAFT FINAL REPORT
 01/77 -FUNDING INCREMENT FOR FINAL REPORT
 02/77 -FINAL REPORT RECEIVED
 PLAN ID..... (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES... RECN-000461 SSIE-GMA 3703 EPA -68-02-1331 TASK-B624B-383
 AP -624B DU -L110 LABT-EMI
 ABSTRACT..... THE OBJECTIVE WAS TO PROVIDE A PRELIMINARY ENVIRONMENTAL ASSESSMENT OF SOLAR ENERGY POWER GENERATION SYSTEMS AND FLAT PLATE COLLECTORS FOR HEATING, AND DEFINE AREAS REQUIRING POLLUTION CONTROL RESEARCH. THE APPROACH WAS TO EVALUATE EXISTING INFORMATION AND SOLAR DEVELOPMENT PROGRAMS. THE OUTPUT IS A REPORT IN LINE WITH THE OBJECTIVES. SOLAR SYSTEMS ARE ENVIRONMENTALLY SUPERIOR TO THEIR CONVENTIONAL ALTERNATIVES. LAND AREA REQUIREMENTS FOR CENTRAL STATION PLANTS WILL BE LARGE BUT NOT DESTRUCTIVE AS COAL STRIPPING. VISUAL EFFECTS CAN BE EXTENSIVE. INDIRECT EFFECTS OF PRODUCING LARGE QUANTITIES OF SOLAR CELL MATERIALS COULD BE ENVIRONMENTALLY HARMFUL. EPA SHOULD ENCOURAGE SOLAR TECHNOLOGIES AS ENVIRONMENTALLY PREFERABLE TO CONVENTIONAL TECHNOLOGIES.

****PROJECT: 00482-EIS FOR A SOLAR POWER STATION**

STARTING/ COMPLETION DATE : 03/76 - 02/77 : FUNDING : ESTIMATED - FY77 / \$ 6000
 TASK CODE=B624B-384 **EPA=68-02-1331 ** (CNTR.) PRIOR FY76 / \$ 57000
 EPA OFFICER.: R HARTLEY EPA/IERL - CINC
 INVESTIGATOR.: DR SEARS LOCKHEED MIS. & SPACE CO INC
 MILESTONES.... 03/76 -FUNDING PACKAGE SUBMITTED
 04/76 -AWARD FUNDS FOR PROJECT
 08/76 -DRAFT FINAL REPORT
 01/77 -FUNDING INCREMENT FOR FINAL REPORT
 02/77 -FINAL REPORT RECEIVED
 PLAN ID..... (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES... RECN-000462 SSIE-GMA 3704 EPA -68-02-1331 TASK-B624B-384
 AP -624B DU -L110 LABT-EMI
 ABSTRACT..... THE OBJECTIVE OF THIS PROJECT WAS TO PRODUCE AN EXAMPLE ENVIRONMENTAL IMPACT STATEMENT FOR A HYPOTHETICAL SOLAR ELECTRIC POWER GENERATING PLANT. THE APPROACH WAS TO SELECT A SITE WHERE APPROPRIATE DATA WERE AVAILABLE AND TO IMPOSE THE HYPOTHETICAL SITUATION UPON IT. THE OUTPUT IS A REPORT SIMULATING THE ENVIRONMENTAL IMPACT OF A HYPOTHETICAL 1000 MNE SOLAR-ELECTRIC PLANT IN THE DESERT OF SOUTHEASTERN NEVADA. RESULTS INDICATE THE PRINCIPAL IMPACTS WOULD BE THE DESTRUCTION OF SOIL AND VEGETATION ON 52 SQUARE KM OF DESERT TERRAIN AND THE DISPLACEMENT OF THE ANIMAL POPULATION. THERE WOULD BE NO EFFECTS ON GROUND WATER, NO THERMAL POLLUTION, NO SURFACE WATER POLLUTION, AND NO NOISE POLLUTION. THE VISUAL IMPACT WOULD BE EXTENSIVE.

****PROJECT: 00483-ENVIRONMENTAL ASSESSMENT OF GEOPRESSURED WATERS AND THEIR PROJECTED USES**

STARTING/ COMPLETION DATE : 04/76 - 12/76 : FUNDING : ESTIMATED - FY77 / \$ 7000
 TASK CODE=B624B-385 **EPA=68-02-1329 ** (CNTR.) PRIOR FY76 / \$ 53000

EPA OFFICER.: R HARTLEY EPA/IERL - CINC
 INVESTIGATOR.: R DANIELS DOW CHEMICAL CO

MILESTONES...: 11/76 -FUNDING PACKAGE SUBMITTED
 04/76 -AWARD FUNDS FOR PROJECT
 08/76 -DRAFT FINAL REPORT
 12/76 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-000463 SSIE-GMA 4396 EPA -68-02-1329 TASK-B624B-385
 AP -624B DU -L110 LABT-EMI

ABSTRACT.....: THE PROJECT OBJECTIVE WAS TO DETERMINE THE POTENTIAL ENVIRONMENTAL CONSEQUENCES OF EXPLOITING THE
 GEOPRESSURED GEOTHERMAL RESOURCES OF THE TEXAS-LOUISIANA GULF COAST AND . . . RECOMMEND AN EPA COURSE
 IN RESEARCH. THE APPROACH INVOLVED THE EVALUATION OF EXISTING DATA AND SEVERAL THEORETICAL STUDIES
 THAT HAVE BEEN MADE IN THE AREA. THE OUTPUT IS A REPORT WITH THE ABOVE TITLE. THE POTENTIAL
 EMISSIONS ARE BRINE FROM WELL MISHAPS, WASTE BRINE, COOLING TOWER DISCHARGES AND NONCONDENSIBLE
 GASES. NOXIOUS GASES ARE NOT ANTICIPATED. SUBSIDENCE IS A DEFINITE AND SERIOUS POSSIBILITY.
 EARTHQUAKE ACTIVITY IS NOT EXPECTED. IN VIEW OF THE PRESENT UNCERTAINTY OF RESOURCE DEVELOPMENT,
 ONLY MODERATE EMPHASIS SHOULD BE PLACED ON ENVIRONMENTAL RESEARCH AT THIS TIME.

****PROJECT: 00484-ENERGY CONSUMPTION FROM PRESENT POLLUTION CONTROL TECHNOLOGY**

STARTING/ COMPLETION DATE : 04/76 - 12/76 : FUNDING : ESTIMATED - FY77 / \$ 5000
 TASK CODE=B624B-386 **EPA=68-02-1320 ** (CNTR.) PRIOR FY76 / \$ 2000

EPA OFFICER.: CC LEE EPA/IERL - CINC
 INVESTIGATOR.: RS HOCKETT MONSANTO RESEARCH CORP

MILESTONES...: 07/75 -FUNDING PACKAGE SUBMITTED
 04/76 -AWARD FUNDS FOR PROJECT
 01/78 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-000464 SSIE-GMA 4381 EPA -68-02-1320 TASK-B624B-386
 AP -624B DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES: THE OBJECTIVES OF THIS TASK ARE: (1) TO ASSESS THE EXISTENCE OF AND ACCURACY OF
 POLLUTION CONTROL ENERGY COST ESTIMATES, AND (2) TO ASSESS, IN THE LIGHT OF SHORTAGES AND
 INCREASING COST OF ENERGY, THE NEED FOR MODIFICATION OF PRESENT APPROACHES TO POLLUTION CONTROL.
 WITHIN THE TIME CONSTRAINTS OF THE PROJECT, THE OBJECT IS TO OBTAIN AS BROAD A PERSPECTIVE AS
 POSSIBLE ON THE PROBLEM AREA FOR EPA PROGRAM PLANNING PURPOSES. SCOPE OF WORK: THE TWO OBJECTIVES
 FOR THIS PROJECT WILL BE MET BY THE FOLLOWING TWO SUBTASKS: SUBTASK 1 - SURVEY THE OPEN LITERATURE
 AND MAKE PERSONAL CONTACTS TO IDENTIFY PREVIOUS EFFORTS AND SUCCESS IN DETERMINING THE ENERGY COSTS
 OF POLLUTION CONTROL. INTEREST IS IN INDUSTRIAL AND UTILITY STATIONARY POINT SOURCES AND IN THE
 RELATED AIR, WATER, AND SOLIDS POLLUTION CONTROL THROUGHOUT THE U.S. ECONOMY. ANALYZE THE
 DEFICIENCIES AND ASSUMPTIONS IN PREVIOUS WORK. SUGGEST ALTERNATIVE APPROACHES TO OBTAINING BETTER
 COST DATA (125 MANHOURS); SUBTASK 2 -IDENTIFY THE RELATIVE ENERGY USES OF VARIOUS POLLUTION CONTROL
 STRATEGIES NOW IN USE TO DETERMINE THE MOST IMPORTANT AREAS FOR REDUCING ENERGY CONSUMPTION. THE
 BASIS SHOULD BE PRESENT INDUSTRY PRODUCTION CAPACITY, BUT WITH ANTICIPATED POLLUTION CONTROL
 ASSUMED TO BE INSTALLED TO SATISFY PRESENT REGULATIONS. IT MAY BE APPROPRIATE TO CONSIDER
 CATEGORIES OF POLLUTANTS, I.E., NOX, SO2, HYDROCARBONS, BOD, COD, TRACE ORGANICS IN WATER, ETC.,
 RATHER THAN INDUSTRY CATEGORIES, IN MAKING COMPARISONS. ALTERNATIVES TO POLLUTION CONTROL THAT ARE
 LESS ENERGY INTENSIVE SHOULD BE IDENTIFIED AND PRIORITIZED. EMPHASIS SHOULD BE PLACED ON
 MODIFICATIONS OF EXISTING PROCESSES RATHER THAN ON TOTALLY NEW APPROACHES (375 MANHOURS).

****PROJECT: 00485-ENVIRONMENTAL ASSESSMENT OF WASTE-TO-ENERGY (388)**

STARTING/ COMPLETION DATE : 10/76 - 09/79 : FUNDING : ESTIMATED - FY77 / \$ 330000
 TASK CODE=B624B-388 **EPA=68-02-2166 ** (CNTR.) PRIOR FY76 / \$ 1117000

EPA OFFICER.: HM FREEMAN EPA/IERL - CINC
 INVESTIGATOR.: MP SCHRAG MIDWEST RES INST TECH ECON SECTION

MILESTONES...: 07/77 -FUNDING PACKAGE SUBMITTED
 08/77 -AWARD FUNDS FOR PROJECT
 01/77 -DEFINE GAPS IN LITERATURE
 02/77 -RECOMMEND PRELIMINARY STANDARD S & A TECHNIQUES
 03/77 -ENVIRONMENTAL CHARACTERIZATION OF ONE MAJOR PROCESS
 03/77 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-000465 SSIE-GMA 3029 1 EPA -68-02-2166 TASK-B624B-388
 AP -624B DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO CHARACTERIZE THE LIQUID, GASEOUS, AND SOLID EMISSION FROM
 VARIOUS WASTE TO ENERGY SYSTEMS. THE CHARACTERIZATION WILL BE BASED ON ACTUAL DATA OBTAINED FROM
 ON-SITE SAMPLING OPERATIONS. THE FIRST REPORT FROM THIS PROJECT WAS DISTRIBUTED IN JULY '77; IT
 REPRESENTED A COLLECTION OF PREVIOUSLY OBTAINED DATA AND WAS CALLED A "SOURCE ASSESSMENT DOCUMENT
 FOR WASTE-AS-FUEL PROCESSES." A CO-FIRING OF WOOD WASTE WITH COAL PROCESS HAS BEEN CHARACTERIZED
 FOR ENVIRONMENTAL EMISSIONS, AS HAS A WASTE PRE-PROCESSING (SHREDDER/AIR CLASSIFICATION) PLANT IN
 HOUSTON, TEXAS. CHARACTERIZATION OF SEVERAL WASTE PYROLYSIS PLANTS IS ENVISIONED, IN ADDITION TO
 THAT OF WATERWALL INCINERATION PLANTS.

****PROJECT: 00486-EVALUATION OF WASTE-TO-ENERGY PROCESSES**

STARTING/ COMPLETION DATE : 06/75 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 54000
 TASK CODE=B624B-389 **EPA-68-02-2101 ** (CNTR.) PRIOR FY76 / \$ 265000
 EPA OFFICER.: HM FREEMAN EPA/IERL - CINC RALPH M. PARSONS CO
 INVESTIGATOR.: EM WILSON RALPH M. PARSONS CO
 MILESTONES...: 02/75 -FUNDING PACKAGE SUBMITTED
 05/75 -AWARD FUNDS FOR PROJECT
 12/76 -DRAFT FINAL REPORT
 06/77 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: RECN-000468 SSIE-GMA 4383 EPA -68-02-2101 TASK-B624B-389
 AP -624B DU -L110 LABT-EMI
 ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO PROVIDE AN OBJECTIVE THIRD-PARTY ENGINEERING EVALUATION OF
 EMERGING WASTE-TO-ENERGY PROCESSES. THE EVALUATION INCLUDED COST FIGURES AND POTENTIAL TECHNICAL
 PROBLEMS FOR THE MOST PROMINENT OF THE CURRENT AND DEVELOPING PROCESSES. SEVEN LEADING PROCESSES
 WERE EVALUATED TECHNICALLY AND ECONOMICALLY.

****PROJECT: 00487-ST. LOUIS WASTE CO-FIRING WITH COAL PROJECT - EQUIPMENT, FACILITIES AND ENVIRONMENTAL EVALUATION OF MERAMAC POWER PLANT**

STARTING/ COMPLETION DATE : 06/68 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 15000
 TASK CODE=B624B-390 **EPA-68-02-1871 ** (CNTR.) PRIOR FY76 / \$ 2000
 EPA OFFICER.: C WILES EPA/IERL - CINC
 INVESTIGATOR.: PG GORMAN MIDWEST RES INST TECH ECON SECTION
 LJ SHANNON MIDWEST RES INST TECH ECON SECTION
 MP SCHRAQ MIDWEST RES INST TECH ECON SECTION
 DE FISCUS MIDWEST RES INST TECH ECON SECTION
 MILESTONES...: 00/00 -FUNDING PACKAGE SUBMITTED
 00/00 -AWARD FUNDS FOR PROJECT
 05/77 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: RECN-000467 SSIE-GMA 3673 EPA -68-02-1871 TASK-B624B-390
 AP -624B DU -L110 LABT-EMI
 ABSTRACT.....: AS PART OF AN EPA DEMONSTRATION GRANT, THE CITY OF ST. LOUIS HAS BEEN PROCESSING MUNICIPAL SOLID
 WASTE AND THE UNION ELECTRIC UTILITY HAS BEEN FIRING IT AS AN AUXILIARY FUEL AT THE MEREMAC POWER
 PLANT. THE FEASIBILITY OF THE CONCEPT HAS BEEN DEMONSTRATED BUT MORE DATA OF A SUBSTANTIVE NATURE
 IS BEING SOUGHT FROM THE PROGRAM. THIS PROCUREMENT IS TO PROVIDE SERVICES TO FULLY TEST AND
 EVALUATE THE REFUSE PREPARATION AND FIRING PROCESSES. SPECIFICALLY, THIS PROJECT PROVIDES FOR TESTS
 TO DETERMINE THE EFFECTS OF FIRING REFUSE AND COAL ON GASES AND PARTICLES EMITTED FROM A 120 MW
 TANGENTIALLY FIRED UTILITY BOILER. TESTS WILL BE MADE TO INVESTIGATE THE MECHANISMS WHICH CAUSE A
 LOSS IN ESP PERFORMANCE. WATER POLLUTION TESTS WILL BE CONDUCTED AND THE EMISSION OF POTENTIALLY
 HAZARDOUS POLLUTANTS WILL BE INVESTIGATED. TESTING AND ENGINEERING ANALYSES WILL BE PERFORMED TO
 TECHNICALLY AND ECONOMICALLY EVALUATE THE REFUSE PREPARATION AND FIRING PROCESSES. REQUIREMENTS FOR
 DESIGN OF EMISSION CONTROL DEVICES WILL BE ESTABLISHED AND PROCESS OR EQUIPMENT MODIFICATIONS
 NECESSARY TO REDUCE PROCESS COST AND TO INCREASE ENERGY OR MATERIAL RECOVERY WILL BE DETERMINED.

****PROJECT: 00488-EVALUATION OF AMES' WASTE PROCESS - AN ENERGY RECOVERY SYSTEM**

STARTING/ COMPLETION DATE : 02/76 - 02/79 : FUNDING : ESTIMATED - FY77 / \$ 250000
 TASK CODE=B624B-391 **EPA-R803903 ** (GRANT) PRIOR FY76 / \$ 464000
 EPA OFFICER.: C WILES EPA/IERL - CINC
 INVESTIGATOR.: AD CHANTLAND AMES CITY GOVT
 LJ SHANNON MIDWEST RES INST TECH ECON SECTION
 AW JOENSEN IOWA STATE UNIV OF SCI & TECH
 ER BAUMAN IOWA STATE UNIV OF SCI & TECH
 MILESTONES...: 04/77 -FUNDING PACKAGE SUBMITTED
 05/77 -AWARD FUNDS FOR PROJECT
 01/77 -FUNDING INCREMENT
 04/77 -GRANT AMENDMENT
 02/78 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: RECN-000468 SSIE-GMA 2719 EPA -R803903 TASK-B624B-391
 AP -624B DU -L110 LABT-EMI
 ABSTRACT.....: THE STUDY WILL ASSESS THE EFFECTS OF USING MUNICIPAL SOLID WASTE (MSW) AS A SUPPLEMENTARY FUEL.
 CO-FIRING OF MSW WITH COAL IN STOKER AND TANGENTIALLY-FIRED BOILERS WILL BE CONDUCTED AND SINCE ONE
 BOILER IS THE SAME AS AT ST. LOUIS, STUDIES WILL PERMIT CONFIRMATION, AND COMPARISON OF SELECTED
 ST. LOUIS RESULTS. ASSESSMENTS WILL BE MADE OF THE TECHNICAL AND ENVIRONMENTAL ASPECTS OF THESE
 CO-FIRING TECHNIQUES. IN ADDITION, TECHNICAL AND ECONOMIC TESTS AND EVALUATIONS WILL BE CONDUCTED
 ON THE SECOND GENERATION MSW PROCESSING FACILITY ASSOCIATED WITH SUPPLYING THE REFUSE DERIVED FUEL.

****PROJECT: 00470-ENVIRONMENTAL EFFECT OF UTILIZING SOLID WASTE AS A SUPPLEMENTARY POWER-PLANT FUEL**

STARTING/ COMPLETION DATE : 06/74 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 98000
TASK CODE=B624B-392 **EPA-RB0400B-02 ** (GRANT) PRIOR FY76 / \$ 503000

EPA OFFICER.: R OLESEY
INVESTIGATOR.: DA VAUGHAN
WK BOYD
HH KRAUSE
RB ENGDAHL

EPA/IERL - CINC
BATTELLE MEMORIAL INST
BATTELLE MEMORIAL INST
BATTELLE MEMORIAL INST
BATTELLE MEMORIAL INST

MILESTONES...: 06/77 -FUNDING SUPPLEMENT
10/78 -FINAL REPORT

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
ORDIS CODES...: REC-000470 SSIE-GMA 3736 EPA -RB0400B-02 TASK-B624B-392
AP -624B DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO INVESTIGATE THE BENEFITS TO THE ENVIRONMENT RESULTING FROM THE UTILIZATION OF SOLID WASTE AS A SUPPLEMENTARY FUEL IN EXISTING COAL-FIRED POWER PLANTS. THE APPROACH IS TO EVALUATE THE GASEOUS AND PARTICULATE EMISSION PLUS THE CORROSIVENESS OF COMBUSTION PRODUCTS AS A FUNCTION OF REFUSE-COAL RATIO AND AS A FUNCTION OF SULFUR CONTENT OF THE COAL. EXPERIMENTS WILL BE CONDUCTED IN AN OPERATING POWER STATION THROUGH COOPERATION OF THE CITY OF COLUMBUS, OHIO, AND AT THE HARRISBURG (PA.) WATERWALL CO. INCINERATION PLANT. FURNACE AND STACK GAS AND PARTICULATE SAMPLES WILL BE COLLECTED THROUGHOUT THE PERIODS THAT CORROSION PROBES ARE INSERTED AT SEVERAL LOCATIONS IN THE HEAT-RECOVERY PASSES. THESE PROBES WILL BE EXAMINED FOR CORROSION ATTACK AND DEPOSIT COMPOSITION FOR VARIOUS GAS AND METAL TEMPERATURES TO PROVIDE GUIDANCE IN FUTURE UTILIZATION OF SOLID WASTE AS A SUPPLEMENTARY FUEL.

****PROJECT: 00471-EFFECTS OF BURNING DENSIFIED FORMS OF MUNICIPAL SOLID WASTE DERIVED FUELS IN INDUSTRIAL UTILITY, AND INSTITUTIONAL STOKER BOILER**

STARTING/ COMPLETION DATE : 06/76 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 117000
TASK CODE=B624B-395 **EPA-68-03-2426 ** (CNTR.) PRIOR FY76 / \$ 300000

EPA OFFICER.: C WILES
INVESTIGATOR.: GH RIGD
MC EIFERT
BT RILEY
LW ANDERSON
JT SWARTZBAUGH

EPA/IERL - CINC
SYSTEMS TECHNOLOGY CORP
SYSTEMS TECHNOLOGY CORP
SYSTEMS TECHNOLOGY CORP
SYSTEMS TECHNOLOGY CORP
SYSTEMS TECHNOLOGY CORP

MILESTONES...: 10/76 -FUNDING PACKAGE SUBMITTED
11/76 -AWARD FUNDS FOR PROJECT
03/77 -PRELIMINARY PERFORMANCE EVALUATION OF SHORT BURNS
06/77 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
ORDIS CODES...: REC-000471 SSIE-GMA 3182 1 EPA -68-03-2426 TASK-B624B-395
AP -624B DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROGRAM IS TO DEMONSTRATE THE USE OF DENSIFIED REFUSE DERIVED FUEL (D-RDF) AS A COAL SUPPLEMENT IN STOKER-EQUIPPED BOILERS AND TO ASSESS THE ENVIRONMENTAL IMPACT OF WIDESPREAD IMPLEMENTATION OF THE CONCEPT. THE QUESTIONS ARE TO BE ANSWERED BY BURNING PELLETIZED, CUBETTED AND BRIQUETTED D-RDF AND COAL IN SPREADER STOKER-EQUIPPED BOILERS. THE COAL: D-RDF RATIO WILL BE VARIED TO ESTABLISH THE IMPACT OF SUBSTITUTION RATIO ON BOILER PERFORMANCE AND THE ENVIRONMENT. AFTER INITIAL TESTING IS COMPLETE, A DEMONSTRATION BURN WILL OCCUR TO ASSESS THE IMPACT OF SUSTAINED FIRING. EACH FUEL-BOILER COMBINATION WILL BE APPROACHED IN A THREE STEP SEQUENCE: (1) A FIELD TRIAL WILL ESTABLISH THE PROCESSABILITY OF THE FUEL BY THE BOILER AND THE MAXIMUM SUBSTITUTION RATIOS USABLE WITHOUT BOILER PROBLEMS; (2) A FIELD TEST WILL QUANTIFY ENVIRONMENTAL, ENERGY AND BOILER IMPACTS OF THE FUEL SYSTEM OVER A RANGE OF BOILER CONDITIONS; (3) A DEMONSTRATION WILL BE PERFORMED. THE PROGRAM SCHEDULE CALLS FOR INITIATION OF TESTING IN SEPTEMBER 1976, AND COMPLETION IN JULY 1977 WITH THE DRAFT REPORT COMPLETE IN OCTOBER 1977.

****PROJECT: 00473-PILOT SCALE PYROLYTIC CONVERSION OF MIXED WASTE TO FUEL**

STARTING/ COMPLETION DATE : 07/75 - 12/77 : FUNDING : ESTIMATED - FY77 / \$ 100000
TASK CODE=B624B-399 **EPA-68-03-2340 ** (CNTR.) PRIOR FY76 / \$ 565000

EPA OFFICER.: WW LIBERICK
INVESTIGATOR.: J PORTER
RH STEPHENS

EPA/IERL - CINC
ENERGY RES CO INC
ENERGY RES CO INC

MILESTONES...: 03/78 -FUNDING PACKAGE SUBMITTED
06/78 -AWARD FUNDS FOR PROJECT
12/76 -GRANT MODIFICATION #1
04/77 -GRANT MODIFICATION #2
12/77 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
ORDIS CODES...: REC-000473 SSIE-GMA 3676 EPA -68-03-2340 TASK-B624B-399
AP -624B DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES: TO DEVELOP MODELS RELATING FRACTION OF FUEL PRODUCTS (GAS, LIQUID, SOLID) PRODUCED IN PYROLYSIS OF VARIOUS TYPES OF SOLID WASTES AS FUNCTION OF PYROLYZED CONDITIONS. SOLID WASTES INCLUDE MIXED MUNICIPAL, AGRICULTURAL, AND INDUSTRIAL WASTES. AN INVESTIGATION OF CHEMICAL CONVERSIONS INCLUDING STEAM GASIFICATION, PARTIAL OXIDATION, AND CATALYTIC EFFECTS OF BED MATERIALS, AS WELL AS DETAILED ANALYSIS AND CHARACTERIZATION OF PYROLYSIS PRODUCTS INCLUDING CHAR AND OIL, WILL BE CONDUCTED. APPROACH: EXPERIMENTAL STUDY USING SMALL BATCH PYROLYZER AND PILOT SIZE (200 KG/HR) FLUIDIZED BED PYROLYZER TO PRODUCE DATA FOR MODEL DEVELOPMENT AND VERIFICATION. STATISTICAL AND SEMI-EMPIRICAL MODELS WILL BE EXAMINED FOR THE NORMAL FLUIDIZED BED PYROLYTIC REACTION AS WELL AS FOR STEAM GASIFICATION AND PARTIAL OXIDATION. SEVERAL CHAR AND OIL SAMPLES WILL BE ANALYZED IN DETAIL TO EVALUATE THE ACCEPTABILITY OF FUEL PRODUCTS. STATUS: FABRICATION OF THE TEST UNITS IS COMPLETED. TEST RUNS ARE UNDERWAY TO ACCUMULATE DATA FOR MODEL VE

****PROJECT: 00475-CHEMICAL RECLAMATION OF SCRAP RUBBER**

STARTING/ COMPLETION DATE : 01/77 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 88000
 TASK CODE=B624B-401 **EPA=R804321-01 ** (GRANT) PRIOR FY76 / \$
 EPA OFFICER.: WW LIBERICK EPA/IERL - CINC
 INVESTIGATOR.: JW LARSEN UNIVERSITY OF TENNESSEE
 MILESTONES...: 10/76 -FUNDING PACKAGE SUBMITTED
 01/77 -AWARD FUNDS FOR PROJECT
 12/77 -DRAFT FINAL REPORT
 03/78 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-N-000475 SSIE-GMA 3718 EPA -R804321-01 TASK-B624B-401
 AP -624B DU -L110 LABT-EMI
 ABSTRACT.....: THE ENVIRONMENTAL PROBLEMS CAUSED BY 200 MILLION TIRES DISCARDED ANNUALLY IN THE UNITED STATES ARE WELL DOCUMENTED. AT PRESENT THERE IS NO GOOD WAY OF DISPOSING OF SCRAP TIRES OR OF RECOVERING THE VALUABLE CARBON MATERIALS WHICH THEY CONTAIN. THE CHIEF OBJECTIVE OF THIS PROJECT IS TO COMPLETE BENCH SCALE ENGINEERING RESEARCH ON A PROCESS WHICH CONVERTS SCRAP RUBBER TO A MIXTURE OF HYDROCARBON GASES, A LOW SULFUR OIL, AND CARBON BLACK. THIS WILL INVOLVE IDENTIFICATION AND SOLUTION OF TECHNICAL PROBLEMS, FOR EXAMPLE, SEPARATION OF THE CATALYST AND CARBON BLACK. IT WILL INCLUDE A COMPLETE ECONOMIC EVALUATION OF THE PROCESS. QUANTITIES OF THE PRODUCTS WILL BE PRODUCED FOR EVALUATION BY POTENTIAL CUSTOMERS. THE DATA NECESSARY FOR THE DESIGN OF A PILOT PLANT W

****PROJECT: 00477-CONVERSION OF SOLID WASTE TO POLYMER GASOLINE**

STARTING/ COMPLETION DATE : 06/75 - 12/77 : FUNDING : ESTIMATED - FY77 / \$ 171000
 TASK CODE=B624B-402 **EPA=D5-0781 ** (IAG) PRIOR FY76 / \$ 235000
 EPA OFFICER.: W LIBERICK EPA/IERL - CINC
 INVESTIGATOR.: CB BENHEM US DOD
 JP DIEBOLD US DOD NAVY
 MILESTONES...: 04/75 -FUNDING PACKAGE SUBMITTED
 06/75 -AWARD FUNDS FOR PROJECT
 12/77 -PROJECT TESTING COMPLETED
 12/77 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-N-000477 SSIE-GMA 3915 EPA -D5-0781 TASK-B624B-402
 AP -624B DU -L110 LABT-EMI
 ABSTRACT.....: OBJECTIVE: TO DETERMINE THE FEASIBILITY, BOTH TECHNICAL AND ECONOMIC, OF PYROLYZING THE ORGANIC FRACTION OF MUNICIPAL SOLID WASTE TO SUFFICIENT QUANTITY OF HYDROCARBON GASES (ETHYLENE, ETHANE, ETC.) TO PRODUCE CHEMICAL INTERMEDIATES. PHASE I OF SUBSEQUENT STUDIES ARE DIRECTED TOWARDS THE POLYMERIZATION OF HYDROCARBON FRACTION TO LIQUID FUEL (POLYMER GASOLINE) SUITABLE FOR INTERNAL COMBUSTION ENGINE OPERATION. APPROACH: 1. AN EXISTING PYROLYSIS UNIT WILL BE OPERATED UNDER VARIOUS CONDITIONS TO MAXIMIZE THE PRODUCTION OF UNSATURATED HYDROCARBONS. 2. A POLYMERIZATION UNIT WILL BE DESIGNED, FABRICATED AND ADDED TO THE PYROLYSIS UNIT. 3. DATA WILL BE OBTAINED OVER A WIDE VARIETY OF CONDITIONS USING THE COMBINED PYROLYSIS AND POLYMERIZATION UNITS. COMPOSITIONAL ANALYSIS OF PYROLYSIS AND POLYMERIZATION PRODUCTS WILL BE PERFORMED FOR EACH TEST CONDITION. 4. PRELIMINARY DESIGN OF A SCALED-UP PILOT PLANT WILL BE DEVELOPED. PROGRESS: STUDIES HAVE BEEN CONDUCTED WITH THE PYROLYSIS UNIT TO OPTIMIZE THE UNSATURATED HYDROCARBONS IN THE OFF-GASES. SEPARATE STUDIES HAVE BEEN MADE ON A GAS CLEANING SYSTEM AND A THERMAL POLYMERIZATION UNIT. POLYMER GASOLINE HAS BEEN PRODUCED FROM THE POLYMERIZATION UNIT USING A COMBINATION OF BOTTLE GASES SIMULATING THE GAS MIXTURE FROM THE PYROLYSIS UNIT. FUTURE TESTS INVOLVE USING GASES FROM THE PYROLYSIS UNIT IN THE GAS CLEANING SYSTEM AND THE POLYMERIZATION UNIT AND AGAIN OPTIMIZE OPERATING PARAMETERS.

****PROJECT: 00480-PROGRAM BRIEFINGS ON ENERGY CONSERVING INDUSTRIAL PROCESS CHANGES**

STARTING/ COMPLETION DATE : 11/76 - 06/77 : FUNDING : ESTIMATED - FY77 / \$ 74000
 TASK CODE=B624B-529 **EPA=68-03-2198 ** (CNTR.) PRIOR FY76 / \$
 EPA OFFICER.: HS SKOVRONEK EPA/IERL - CINC
 INVESTIGATOR.: H HALEY ARTHUR D. LITTLE INC
 MILESTONES...: 10/76 -FUNDING PACKAGE SUBMITTED
 11/76 -AWARD FUNDS FOR PROJECT
 10/77 -DRAFT FINAL REPORT RECEIVED
 02/78 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-N-000480 SSIE-GMA 4395 EPA -68-03-2198 TASK-B624B-529
 AP -624B DU -L110 LABT-EMI
 ABSTRACT.....: THE OBJECTIVES OF THIS PROGRAM ARE TO PROVIDE BRIEFINGS IN WASHINGTON, RESEARCH TRIANGLE PARK AND CINCINNATI ON THE RESULTS OF THE ENERGY/ENVIRONMENT STUDY CONDUCTED BY ARTHUR D. LITTLE, INC. UNDER EPA CONTRACT 68-03-2198. ALSO INCLUDED IN THE PROGRAM IS THE PUBLICATION OF INFORMATION OBTAINED IN THIS STUDY AND CATEGORIZED BY POLLUTANT RATHER THAN BY INDUSTRIAL SEGMENT.

****PROJECT: 00481-WASTE HEAT RECOVERY POTENTIAL FOR ENVIRONMENTAL BENEFITS IN SELECTED INDUSTRIES**

STARTING/ COMPLETION DATE : 04/77 - 01/78 : FUNDING : ESTIMATED - FY77 / \$ 70000
 TASK CODE=B624B-530 **EPA-68-01-4454 ** (CNTR.) PRIOR FY76 / \$ 46000

EPA OFFICER.: CC LEE EPA/IERL - CINC
 INVESTIGATOR.: SR LATOUR D S S ENGINEERS INC
 C KIEFER D S S ENGINEERS INC
 R NIMO D S S ENGINEERS INC

MILESTONES...: 07/75 -FUNDING PACKAGE SUBMITTED
 03/77 -AWARD FUNDS FOR PROJECT
 01/78 -INTERIM REPORT RECEIVED
 08/79 -FINAL REPORT

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-000481 SSIE-GMA 3701 EPA -68-01-4454 TASK-B624B-530
 AP -624B DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS TASK IS TO IDENTIFY THE POINTS, QUANTITY, AND QUALITY OF HEAT DISCHARGED FROM:
 1) ESTABLISHED INDUSTRIAL TECHNOLOGIES NOW DISCHARGING SUBSTANTIAL AMOUNTS OF WASTE HEAT TO THE ENVIRONMENT AND 2) EMERGING TECHNOLOGIES FOR ENERGY DEVELOPMENT, CONVERSION AND UTILIZATION. THE PURPOSE OF THIS STUDY IS TO PRESENT DETAILED DATA ON HEAT AND WATER DISCHARGED FROM INDUSTRIES AND EMERGING TECHNOLOGIES, FOR ENERGY DEVELOPMENT, WHICH ARE DISCHARGING SUBSTANTIAL QUANTITIES OF WASTE HEAT TO THE ENVIRONMENT, IN SUCH A MANNER THAT IT MAY BE EFFECTIVELY USED TO: 1) ASSESS THE RELATIVE ECONOMIC AND ENVIRONMENTAL EFFECTS OF UTILIZING WASTE HEAT, 2) ASSURE THE DEVELOPMENT OF ENVIRONMENTALLY COMPATIBLE CONTROL TECHNOLOGY NECESSARY FOR EFFICIENT WASTE HEAT UTILIZATION. SCOPE OF WORK: IN ORDER TO ACCOMPLISH THIS OBJECTIVE THE FOLLOWING SUB-TASK WILL BE PERFORMED: 1) IDENTIFICATION OF WASTE HEAT DISCHARGING INDUSTRIES AND TECHNOLOGIES. 2) DETERMINATION OF THE MAIN PROCESSES IN USE. 3) ESTABLISHMENT OF INDUSTRIAL OR TECHNOLOGICAL SUB-CATEGORIES. 4) PREPARATION OF HEAT FLOW CHARTS AND DIAGRAMS. 5) DETERMINATION OF ANNUAL WASTE HEAT DISCHARGE OF EACH SUB-CATEGORY. 6) CATEGORIZE TYPES OF WASTE HEAT DISCHARGED ACCORDING TO QUALITY, QUANTITY, AND POTENTIAL OF UTILIZATION. 7) PRESENT TOTAL WASTE HEAT DISCHARGED OF EACH WASTE HEAT CATEGORY. A) AS A PERCENT OF THE TOTAL INDUSTRIAL CONSUMPTION OF ENERGY; B) AS A PERCENTAGE OF EACH SIC GROUP; C) ACCORDING TO GEOGRAPHICAL DISTRIBUTION. 8) IDENTIFY FURTHER R AND D NEEDS.

****PROJECT: 00483-ENVIRONMENTAL, ECONOMIC, AND CONSERVATION ASPECTS OF INTEGRATED ENERGY USE APPLICATIONS**

STARTING/ COMPLETION DATE : 07/75 - 01/78 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=B624B-531 **EPA-68-03-2394 ** (CNTR.) PRIOR FY76 / \$ 70000

EPA OFFICER.: CC LEE EPA/IERL - CINC
 INVESTIGATOR.: RP ZIMMER GEORGIA INST OF TECH GRADUATE SCH

MILESTONES...: 07/75 -FUNDING PACKAGE SUBMITTED
 03/76 -AWARD FUNDS FOR PROJECT
 01/78 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-000483 SSIE-GMA 4384 EPA -68-03-2394 TASK-B624B-531
 AP -624B DU -L110 LABT-EMI

ABSTRACT.....: THE PURPOSE OF THIS PROJECT IS TO PROVIDE UP-TO-DATE ANALYSES OF THE ENVIRONMENTAL, ECONOMIC AND TECHNICAL FEASIBILITY OF ALTERNATIVES FOR SUPPLYING TOTAL ENERGY NEEDS, TO ASSESS VARIOUS INTEGRATED ENERGY SYSTEM CONCEPTS FOR SUPPLYING MULTIPURPOSE ENERGY FOR UTILITY AND INDUSTRIAL NEEDS, TO IDENTIFY THE TECHNICAL FEASIBILITY OF MATCHING INDUSTRIAL PROCESSES TO THERMAL OUTPUTS OF POWER PLANTS, TO ANALYZE EXTENSIVELY SEVERAL FINAL CONCEPTS SELECTED FOR THEIR POTENTIAL FOR FUTURE ENVIRONMENTALLY SOUND DEVELOPMENTS, AND TO MAKE RECOMMENDATIONS ABOUT FUTURE ENVIRONMENTAL RESEARCH AND DEVELOPMENT ACTIVITIES BASED ON THE PROJECT RESULTS. THIS RESEARCH STUDY WILL FOLLOW A PHASE-ORIENTED PROGRAM TO ACHIEVE ITS OBJECTIVES. FIVE PHASES HAVE BEEN IDENTIFIED AND ARE LISTED BELOW: PHASE 1: PROJECT MANAGEMENT, PHASE 2: ENVIRONMENTAL, ECONOMIC AND TECHNOLOGICAL OVERVIEW AND PRELIMINARY CONCEPT IDENTIFICATION, PHASE 3: METHODOLOGY DEVELOPMENT AND FINAL CONCEPT SELECTION, PHASE 4: CONCEPT ANALYSIS AND EVALUATION, PHASE 5: CONCLUSION AND RECOMMENDATION

****PROJECT: 00484-DEVELOPMENT OF SAMPLING PLAN FOR GEOTHERMAL MANIFESTATIONS**

STARTING/ COMPLETION DATE : 04/77 - 10/77 : FUNDING : ESTIMATED - FY77 / \$ 10000
 TASK CODE=B624B-532 **EPA-68-03-1291 ** (CNTR.) PRIOR FY76 / \$

EPA OFFICER.: RP HARTLEY EPA/IERL - CINC
 INVESTIGATOR.: C LEAVITT THOMPSON RAMO WOOLDRIDGE INC

MILESTONES...: 04/77 -FUNDING PACKAGE SUBMITTED
 04/77 -AWARD FUNDS FOR PROJECT
 10/77 -FINAL REPORT

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-000484 SSIE-GMA 4394 EPA -68-03-1291 TASK-B624B-532
 AP -624B DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO DEVISE A PLAN FOR SAMPLING GEOTHERMAL FLUIDS AT VARIOUS SITES, PRIORITIZED ON THE BASIS OF ADEQUACY OF EXISTING DATA, STAGE OF DEVELOPMENT OF THE RESOURCE AREA, SIGNIFICANCE OF POTENTIAL POLLUTION AND SAMPLING COSTS. THE PLAN WILL BE DESIGNED TO ENCOMPASS THE RANGE OF RESOURCE CHARACTERISTICS. THE APPROACH IS TO EXAMINE THE EXISTING DATA BASE AND FIELD DEVELOPMENTS AND EVALUATE NEEDS THEREFROM. THE OUTPUT WILL BE A PLAN TO SUPPORT AND JUSTIFY A GEOTHERMAL FLUID DATA-GATHERING EFFORT, AS A BASE FOR FURTHER REFINING POLLUTION CONTROL TECHNOLOGY NEEDS.

****PROJECT: 00485-MONITORING SOLAR WASTEWATER TREATMENT**

STARTING/ COMPLETION DATE : 05/77 - 06/79 : FUNDING : ESTIMATED - FY77 / \$ 60000
 TASK CODE=B624B-534 **EPA=68-03-2587 ** (CNTR.) PRIOR FY76 / \$ 60000

EPA OFFICER.: CC LEE
 INVESTIGATOR.: RC CROCKETT
 MILESTONES.... 05/77 -FUNDING PACKAGE SUBMITTED
 06/77 -AWARD FUNDS FOR PROJECT
 01/80 -FINAL REPORT
 06/79 -FINAL REPORT RECEIVED

PLAN ID..... (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES... RECN-000485 SSIE-GMA 4530 EPA -68-03-2587 TASK-B624B-534
 AP -624B DU -L110 LABT-EMI

ABSTRACT..... THIS IS ONE OF A MULTI-PART PROJECT WHOSE SUMMARY MAY BE IDENTICAL TO OTHERS. OBJECTIVES: THE PURPOSE OF THIS CONTRACT IS TO DETERMINE THE MOST ENERGY-EFFECTIVE METHOD OF OPERATING A MUNICIPAL WASTEWATER TREATMENT PLANT USING AN INTEGRATED ENERGY SYSTEM OF SOLAR ENERGY, DIGESTER METHANE, AND HEAT PUMPS. APPROACHES: THE APPROACHES FOR PERFORMING THIS PROJECT INCLUDE: 1) MONITOR AND DOCUMENT THE OPERATIONAL PERFORMANCE OF THE SOLAR ENERGY SYSTEM INCLUDING THE COLLECTION, THE STORAGE, THE TRANSMITTAL, AND THE USE OF SOLAR ENERGY. 2) MONITOR AND DOCUMENT THE OPERATION PERFORMANCE OF THE ANAEROBIC DIGESTER. 3) GATHER DATA IN APPROPRIATE CLIMATIC PARAMETERS AND RELATE THEIR IMPACT ON THE SOLAR ENERGY SYSTEM AND DIGESTER SUPPLEMENTAL ENERGY REQUIREMENTS. 4) IDENTIFY EACH ENERGY DEMAND IN THE TREATMENT PLANTS AS A PERCENTAGE CONTRIBUTION OF (A) SOLAR ENERGY, (B) DIGESTER GAS, (C) HEAT PUMP, (D) EFFLUENT EXCHANGE, AND (E) EMERGENCY ELECTRICAL GENERATION. 5) IDENTIFY THE MOST COST-EFFECTIVE TECHNIQUES FOR SUPPLYING PLANT ENERGY DEMAND THROUGH THE COMBINED USE OF SOLAR ENERGY, ELECTRICAL POWER, AND DIGESTER GAS.

****PROJECT: 00487-ASSESSMENT OF LARGE-SCALE PHOTOVOLTAIC MATERIALS PRODUCTION**

STARTING/ COMPLETION DATE : 11/76 - 11/76 : FUNDING : ESTIMATED - FY77 / \$ 5000
 TASK CODE=B624B-536 **EPA=68-02-1331 ** (CNTR.) PRIOR FY76 / \$ 23000

EPA OFFICER.: R HARTLEY
 INVESTIGATOR.: DR SEARS
 MILESTONES.... 11/76 -FUNDING PACKAGE SUBMITTED
 11/76 -AWARD FUNDS FOR PROJECT
 11/76 -DRAFT FINAL REPORT
 04/77 -FINAL REPORT RECEIVED

PLAN ID..... (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES... RECN-000487 SSIE-GMA 4389 EPA -68-02-1331 TASK-B624B-536
 AP -624B DU -L110 LABT-EMI

ABSTRACT..... THE OBJECTIVES OF THIS STUDY WERE TO ASSESS THE ENVIRONMENTAL IMPACT OF LARGE INCREASES IN THE PRODUCTION OF SOLAR CELL MATERIALS ASSUMING THAT PHOTOVOLTAICS WOULD PROVIDE 1% OF THE NATIONAL ELECTRICAL ENERGY REQUIREMENT. THREE TYPES OF CELL PRODUCTION-SILICON, CADMIUM SULFIDE, AND GALLIUM ARSENIDE WERE EXAMINED. THE APPROACH WAS TO INVESTIGATE THE EXISTING AND DEVELOPING PRODUCTION METHODS AND TO CALCULATE POTENTIAL POLLUTION DISCHARGE AND EMISSION LOADINGS. THE FINAL REPORT IS COMPLETE. FOR SILICON PRODUCTION, THE NECESSARY POWER CONSUMPTION PRODUCES INDIRECT AIR EMISSIONS OVER HALF AS LARGE AS THE COAL-BURNING PLANTS THAT THE SILICON CELLS MIGHT REPLACE. FOR THE OTHERS, ATMOSPHERIC CADMIUM RELEASES, AND POTENTIAL CADMIUM AND ARSENIC SPILLS ARE THE MAJOR POTENTIAL PROBLEM AREAS.

****PROJECT: 00488-PYROLYSIS OF AGRICULTURAL RESIDUES AND FEEDLOT WASTES IN A REACTIVE STEAM ATMOSPHERE**

STARTING/ COMPLETION DATE : 11/76 - 01/79 : FUNDING : ESTIMATED - FY77 / \$ 86000
 TASK CODE=B624B-538 **EPA=R804836-01 ** (GRANT) PRIOR FY76 / \$ 86000

EPA OFFICER.: WW LIBERICK
 INVESTIGATOR.: MJ ANTAL
 MILESTONES.... 11/76 -FUNDING PACKAGE SUBMITTED
 02/77 -AWARD FUNDS FOR PROJECT
 12/77 -INTERIM REPORT
 01/78 -AWARD CONTINUATION
 11/78 -DRAFT FINAL REPORT
 01/79 -FINAL REPORT

PLAN ID..... (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES... RECN-000488 SSIE-GMA 3716 EPA -R804836-01 TASK-B624B-538
 AP -624B DU -L110 LABT-EMI

ABSTRACT..... A PROGRAM TO INVESTIGATE THE PYROLYSIS OF AGRICULTURAL RESIDUES AND FEEDLOT WASTES IN A STEAM ATMOSPHERE IS TO BE DONE. THE PROGRAM IS MOTIVATED BY THE EVIDENT NEED TO UPGRADE THE ENERGY VALUE OF ORGANIC WASTES FOR THEM TO BECOME A NATIONALLY SIGNIFICANT FUEL RESOURCE. HYDROGEN PRODUCED FROM SOLID WASTES BY STEAM PYROLYSIS COULD BE USED TO MEET A PORTION OF THE NATION'S NATURAL GAS DEMAND. EXPERIMENTAL WORK ON THE KINETICS OF STEAM PYROLYSIS IS NEEDED TO DESIGN A PRACTICAL REACTOR SYSTEM AND TO ESTABLISH THE REGIMES WHERE MINIMUM LEVELS OF ENVIRONMENTAL POLLUTANTS ARE PRODUCED. THE RESEARCH PROGRAM OUTLINED IN THIS EFFORT WILL INVESTIGATE AT THE BENCH THE EFFECTS OF DIVERSE PARAMETERS, E.G., HEATING RATE AND ULTIMATE TEMPERATURE, PARTICLE SIZE, REACTOR RESIDENCE TIME AND PRESSURE ON STEAM PYROLYSIS. IN ADDITION, CATALYSIS OF THE PYROLYSIS REACTIONS AND EFFECTS OF TRACE CONSTITUENTS OF THE WASTE ON CATALYSIS WILL ALSO BE STUDIED. MATHEMATICAL MODELS BASED ON DIFFERENTIAL EQUATIONS DESCRIBING THE RATE PROCESSES WILL BE DEVELOPED WHEN APPROPRIATE. THE RESEARCH PROGRAM IS AIMED AT DETERMINING THE OPTIMAL CONDITIONS FOR THE PRODUCTION OF A SYNTHESIS GAS (COMPOSED PRIMARILY OF H₂, CO, AND CO₂) FROM ORGANIC WASTES BY STEAM PYROLYSIS. IN ORDER TO ACHIEVE THIS GOAL, YIELDS OF CHAR AND LIQUID PRODUCTS WILL BE MINIMIZED. ULTIMATE PYROLYSIS TEMPERATURES WILL ALSO BE KEPT AS LOW AS POSSIBLE, BUT OTHER CONDITIONS WILL BE TREATED AS TRUE VARIABLES IN THE OPTIMIZATION PROCESS. RESULTS FROM THIS RESEARCH WILL FACILITATE THE DESIGN OF A CONTINUOUS, SMALL-SCALE CHEMICAL REACTOR PRIMARILY FOR WASTE GASIFICATION, THOUGH SOME WASTE LIQUEFACTION INFORMATION WILL ALSO RESULT.

****PROJECT: 00490-ASSESSMENT OF COMBUSTION OF RDF FUELS**

STARTING/ COMPLETION DATE : 04/77 - 04/79 : FUNDING : ESTIMATED - FY77 / \$ 159000
 TASK CODE=B624B-542 **EPA-68-02-1885 ** (CNTR.) PRIOR FY76 /
 EPA OFFICER.: HM FREEMAN EPA/IERL - CINC AEROTHERM DIV
 INVESTIGATOR.: C HARTMAN ACUREX CORP
 MILESTONES...: 04/77 -FUNDING PACKAGE SUBMITTED
 08/77 -AWARD FUNDS FOR PROJECT
 09/78 -FINAL REPORT
 04/79 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: RECN-000490 SSIE-GMA 3674 EPA -68-02-1885 TASK-B624B-542
 AP -624B DU -L110 LABT-EMI
 ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO ASSESS POLLUTANT FORMATION DURING THE COMBUSTION OF
 REFUSE-DERIVED FUELS (RDF) AS A FUNCTION OF COMBUSTION PARAMETERS (SUCH AS AIR-TO-FUEL RATIO, SOLID
 PARTICLE RESIDENCE TIME, COMBUSTION TEMPERATURE, ETC). POLLUTANT CONTROL WITHIN THE COMBUSTION
 CHAMBER WILL ALSO BE ASSESSED. THE APPROACH WILL BE TO UTILIZE AN ALREADY EXISTING,
 GOVERNMENT-OWNED, SMALL-SCALE (PILOT) TEST FURNACE FOR THE COMBUSTION EXPERIMENTS. THE RDF FUEL
 SYSTEM WILL BE CAPABLE OF FIRING ABOUT 100 POUNDS OF RDF PER HOUR.

****PROJECT: 00494-ENVIRONMENTAL AND TECHNOLOGICAL ANALYSIS OF THE USE OF SURPLUS WOOD AS
 AN INDUSTRIAL FUEL**

STARTING/ COMPLETION DATE : 07/77 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 57000
 TASK CODE=B624B-546 **EPA-R805050-01 ** (GRANT) PRIOR FY76 /
 EPA OFFICER.: HM FREEMAN EPA/IERL - CINC
 INVESTIGATOR.: EH HALL BATTELLE MEMORIAL INST
 WT LAWHON BATTELLE MEMORIAL INST
 CM ALLEN BATTELLE MEMORIAL INST
 MILESTONES...: 07/77 -FUNDING PACKAGE SUBMITTED
 08/77 -AWARD FUNDS FOR PROJECT
 05/78 -FINAL REPORT
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: RECN-000494 SSIE-GMA 3728 EPA -R805050-01 TASK-B624B-546
 AP -624B DU -L110 LABT-EMI
 ABSTRACT.....: THERE IS A WIDESPREAD INTEREST IN THE USE OF SURPLUS WOOD AS AN INDUSTRIAL FUEL BECAUSE IT DOES NOT
 CONTAIN SULFUR, IT IS A RENEWABLE RESOURCE, AND THE TECHNOLOGY FOR ITS USE IS AVAILABLE. THERE ARE,
 HOWEVER, SOME UNRESOLVED QUESTIONS WHICH MUST BE ADDRESSED AT THIS TIME IN ORDER TO BE SURE THAT NO
 LONG-RANGE DETRIMENTAL EFFECTS WOULD RESULT FROM A GREATLY EXPANDED WOOD-FUEL INDUSTRY. THE
 OBJECTIVES OF THIS PROJECT ARE: 1. TO ANALYZE THE POTENTIAL AVAILABILITY OF SURPLUS WOOD BY REGION
 AND COMPARE THAT AVAILABILITY WITH POTENTIAL REGIONAL DEMAND FOR WOOD FUEL, 2. TO ASSESS THE
 CURRENT STATE OF THE TECHNOLOGY FOR THE PROCUREMENT AND UTILIZATION OF SURPLUS WOOD FUEL, TO
 PROJECT POTENTIAL CONSUMPTION OF WOOD FUEL ON THE BASIS OF EXISTING TECHNOLOGY, AND TO IDENTIFY ANY
 TECHNOLOGY-RELATED RESEARCH AND DEVELOPMENT NEEDS, 3. TO ASSESS THE ENVIRONMENTAL/ECOLOGICAL
 IMPACTS WITH RESPECT TO SO2 EMISSIONS, AND WITH RESPECT TO POTENTIAL LONG-RANGE IMPACTS ON OUR
 FORESTS

****PROJECT: 00499-CHEMISTRY OF HIGH TEMPERATURE GEOTHERMAL BRINES**

STARTING/ COMPLETION DATE : 02/77 - 06/77 : FUNDING : ESTIMATED - FY77 / \$ 10000
 TASK CODE=B624B-585 **EPA-68-03-1239 ** (CNTR.) PRIOR FY76 /
 EPA OFFICER.: RP HARTLEY EPA/IERL - CINC
 INVESTIGATOR.: UNKNOWN LOCKHEED MIS. & SPACE CO INC
 MILESTONES...: 01/77 -FUNDING PACKAGE SUBMITTED
 02/77 -AWARD FUNDS FOR PROJECT
 04/77 -DRAFT REPORT
 06/77 -FINAL REPORT RECEIVED
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: RECN-000499 SSIE-GMA 4535 EPA -68-03-1239 TASK-B624B-585
 AP -624B DU -L110 LABT-EMI
 ABSTRACT.....: THE STUDY WILL REVIEW THE INFORMATION AVAILABLE ON THE HIGH TEMPERATURE, HIGH PRESSURE AQUEOUS
 CHEMISTRY OF THE IMPORTANT CONSTITUENTS OF GEOTHERMAL BRINES THAT ARE MOST LIKELY TO RESULT IN
 PRECIPITATION, OUTGASSING, SCALING AND CORROSION DURING CLOSED LOOP BRINE HANDLING. THE STUDY WILL
 BE ORIENTED TOWARD THE POTENTIAL FOR POLLUTANT RELEASE TO THE ENVIRONMENT AND THE PREVENTION
 THEREOF. THE APPROACH WILL BE A LITERATURE SURVEY. THE OUTPUT WILL BE A REPORT SUMMARIZING THE
 CURRENT STATE OF KNOWLEDGE, OUTLINING CURRENT MAJOR RESEARCH ACTIVITIES IN THIS AREA, AND DEFINING
 SIGNIFICANT GAPS IN OUR UNDERSTANDING OF HIGH TEMPERATURE, HIGH PRESSURE BRINE CHEMISTRY. THE
 OUTPUT WILL BE USED TO ASSIST IN DETERMINING THE ENVIRONMENTAL RESEARCH NEEDS RELATED TO
 BRINE-INDUCED SYSTEM FAILURES.

****PROJECT: 00500-CONSTRUCTION OF THE MERL/IERL T & E FACILITY**

STARTING/ COMPLETION DATE : 09/77 - 11/78 : FUNDING : ESTIMATED - FY77 / \$ 437000
 TASK CODE=B624B-596 **EPA-68-03-6008 ** (CNTR.) PRIOR FY76 /

EPA OFFICER.: V JELEN
 INVESTIGATOR.: RA KOETEERS
 MILESTONES...: 03/77 -FUNDING PACKAGE SUBMITTED
 09/77 -AWARD OF PROJECT
 11/78 -CONSTRUCTION COMPLETE
 05/79 -PROGRAM OPERATIONAL

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-N-000500 SSIE-GMA 4638 EPA -68-03-6008 TASK-B624B-596
 AP -624B DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVE IS THE CONSTRUCTION OF A MULTIPURPOSE TEST AND EVALUATION FACILITY FOR THE ENVIRONMENTAL PROTECTION AGENCY AT THE SITE OF THE METROPOLITAN SEWER DISTRICT OF CINCINNATI TREATMENT FACILITY, 1600 GEST STREET, CINCINNATI, OHIO IN ACCORDANCE WITH PLANS AND SPECIFICATIONS. THE BUILDING WILL BE TWO STORIES OF STEEL FRAMING WITH A SUPERSTRUCTURE OF ROLLED STRUCTURAL STEEL SECTIONS. EXTERIOR WILL CONSIST OF COLORED METAL WALL PANELS TO MATCH EXISTING STRUCTURE OF THE TREATMENT PLANT. THE BUILDING WILL CONTAIN A LARGE TWO STORY EXPERIMENTAL AREA (APPROX. 24,000 SQ. FT.). LABORATORIES FOR EXPERIMENTAL CONTROL, AND OFFICES TO HOUSE PERSONNEL WORKING ON PROJECTS (APPROX. 6,000 SQ.

****PROJECT: 00502-WORKSHOP ON WASTE-TO-ENERGY TECHNOLOGY**

STARTING/ COMPLETION DATE : 08/77 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 25000
 TASK CODE=B624B-625 **EPA-R805561-01 ** (GRANT) PRIOR FY76 /

EPA OFFICER.: H FREEMAN
 INVESTIGATOR.: GR SMITHSON
 ST DINOVO
 MILESTONES...: 08/77 -FUNDING PACKAGE SUBMITTED
 08/77 -AWARD FUNDS FOR PROJECT
 11/77 -CONFERENCE
 03/78 -SUMMARY REPORT
 00/00 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-N-000502 SSIE-GMA 3916 EPA -R805561-01 TASK-B624B-625
 AP -624B DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THE PROPOSED PROJECT IS TO DEVELOP AND CONDUCT A WORKSHOP WHICH WILL PROVIDE A FORUM FOR REVIEWING THE STATE OF THE ART OF WASTE-TO-ENERGY TECHNOLOGY, FOR ASSESSING PROBLEM AREAS, AND FOR SUGGESTING APPROACHES FOR THE CONTINUED DEVELOPMENT OF THIS TECHNOLOGY. PARTICIPANTS IN THE WORKSHOP WILL INCLUDE REPRESENTATIVES FROM BOTH THE TECHNOLOGICAL AND USER COMMUNITIES. SPECIES DETAILS REGARDING THE FORMAT, SCHEDULING, AND LOCATION OF THE WORKSHOP AS WELL AS THE PREPARATION OF A LIST OF POTENTIAL PARTICIPANTS WILL BE DEVELOPED BY A WORKSHOP COMMITTEE COMPOSED OF REPRESENTATIVES OF U.S. EPA, BATTELLE, AND OTHERS. THIS COMMITTEE WILL BE SELECTED AND BEGIN ITS WORK IMMEDIATELY UPON THE EXECUTION OF THIS GRANT. A BRIEF REPORT IN WHICH THE FINDINGS AND RECOMMENDATIONS OF THE WORKSHOP PARTICIPANTS WILL BE PREPARED AT THE CONCLUSION OF THE PROJECT.

****PROJECT: 00503-CO-FIRING OF SOLID WASTE WITH COAL IN A CEMENT KILN**

STARTING/ COMPLETION DATE : 07/77 - 12/78 : FUNDING : ESTIMATED - FY77 / \$ 200000
 TASK CODE=B624B-626 **EPA-R805613-01 ** (GRANT) PRIOR FY76 /

EPA OFFICER.: R OLEXSEY
 INVESTIGATOR.: CR WILLEY
 MILESTONES...: 08/77 -FUNDING PACKAGE SUBMITTED
 09/77 -AWARD FUNDS FOR PROJECT
 12/78 -FINAL REPORT

PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-N-000503 SSIE-GMA 3719 EPA -R805613-01 TASK-B624B-626
 AP -624B DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO INVESTIGATE THE TECHNICAL AND ECONOMIC FEASIBILITY OF CO-FIRING SOLID WASTE WITH COAL IN AN EXISTING FULL-SCALE CEMENT KILN. THIS PROJECT WILL ADDRESS BOTH THE RESOURCE RECOVERY ASPECTS OF USING WASTE AS A SUPPLEMENTARY FUEL AND THE INDUSTRIAL CONSERVATION ASPECTS OF PRESERVING CONVENTIONAL (HIGH-PRICED, HIGH-SULFUR) FOSSIL FUELS. APPROXIMATELY 3000 TONS OF REFUSE-DERIVED FUEL WILL BE CO-FIRED IN THE DIRECT-FIRED KILN. DURING THESE CO-COMBUSTION TESTS, ENVIRONMENTAL ANALYSES OF PROCESS EFFLUENTS WILL BE CARRIED OUT.

****PROJECT: 02945-GEOTHERMAL SYSTEMS/ENVIRONMENTAL ASSESSMENT OF EXTRACTION, CONVERSION AND WASTE DISPOSAL**

STARTING/ COMPLETION DATE : 09/76 - 09/81 : FUNDING : ESTIMATED - FY77 / \$ 0
 TASK CODE=J624B-60 **EPA=68-03-2468 ** (CNTR.) PRIOR FY76 / \$ 424500
 EPA OFFICER.: DB GILMORE EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: SK SANYAL GEONOMICS INC
 MILESTONES...: 02/77 -GEOLOGIC, HYDROLOGIC ASSESSMENT REPORT
 06/77 -ENVIRONMENTAL IMPACT RESEARCH REPORT
 06/77 -SITING AND LEASING GUIDE
 09/77 -GEOTHERMAL RESOURCE USES, CONVERSION PROCESSES, WASTES REPORT
 09/77 -MONITORING STRATEGY DESIGN
 09/78 -POLLUTION CONTROL TECHNOLOGY REPORT
 09/81 -FINAL REPORT
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-002945 SSIE-GMA 4094 EPA -68-03-2468 TASK-J624B-60
 AP -624B DU -L110 LABT-MTS

ABSTRACT.....: OBJECTIVE: A GUIDELINE DOCUMENT FOR THE MULTI-MEDIA MONITORING STRATEGY AROUND ANY GEOTHERMAL RESOURCE DEVELOPMENT. THIS OUTPUT WILL BE USED BY THE FEDERAL, STATE, AND LOCAL GOVERNMENTS TO MONITOR THE CHANGES IN SURFACE AND UNDERGROUND WATERS AS A RESULT OF THE DEVELOPMENT OF GEOTHERMAL RESOURCES. APPROACH: DETERMINE THE GEOLOGY, HYDROLOGY, AND CLIMATOLOGY OF THE GEYSERS AND IMPERIAL VALLEY, CALIFORNIA, GEOTHERMAL AREAS, THE KLAMATH FALLS, OREGON, AREA, THE RIO GRANDE RIFT ZONE AREA, AND IDENTIFY THE AQUIFERS IN EACH AREA. DEFINE THE VARIOUS GEOTHERMAL SYSTEMS, QUANTIFY THE POLLUTANTS FROM GEOTHERMAL RESOURCES DEVELOPMENT INCLUDING PHASE OF PRODUCE FLUIDS, SUBSIDENCE POSSIBILITIES, SEISMIC EFFECTS, FLUID DISPOSAL METHODS, THERMAL LOSSES AND THEIR POSSIBLE EFFECTS ON THE BIOTA AND GROUNDWATER OF EACH AREA. SELECT A STUDY AREA AND DESIGN A MONITORING SYSTEM FOR THE AREA. IMPLEMENT AND OPERATE THE MONITORING PROGRAM MAKING SUCH RECOMMENDATIONS FOR IMPROVEMENT IN THE MONITORING PLAN AS DEEMED ADVISABLE. AS A RESULT OF THE EXPERIENCE IN DESIGNING AND OPERATING SUCH A MONITORING SYSTEM, MAKE RECOMMENDATIONS FOR A GENERAL MONITORING METHODOLOGY THAT WILL BE MOST APT TO MEET THE REQUIRMENTS OF ANY GEOTHERMAL RESOURCE DEVELOPMENT. OUTPUT: GEOLOGIC, HYDROLOGIC ASSESSMENT REPORT (2/77); ENVIRONMENTAL IMPACT RESEARCH REPORT (6/77); SITING AND LEASING GUIDE (6/77); GEOTHERMAL RESOURCE USES, CONVERSION PROCESSES, WASTES REPORT (9/77); MONITORING STRATEGY DESIGN (9/77); POLLUTION CONTROL TECHNOLOGY REPORT (9/77); FINAL REPORT (9/81).

****PROJECT: 02946-GEOTHERMAL ENVIRONMENTAL IMPACT ASSESSMENT - FAUNA**

STARTING/ COMPLETION DATE : 06/76 - 12/82 : FUNDING : ESTIMATED - FY77 / \$ 20000
 TASK CODE=J624B-61 **EPA= ** (IN-HO) PRIOR FY76 / \$ 96000
 IN-HOUSE EFFORT : FY 77 / 01.5 YEARS ; TOTAL PROJECT 03.0
 EPA OFFICER.: DB GILMORE EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: WW SUTTON US EPA
 ZC NELSON US EPA
 AA MULLEN US EPA
 GD POTTER US EPA
 MILESTONES...: 09/77 -ANNUAL REPORT COVERING IMPERIAL VALLEY AND ROOSEVELT HOT SPRINGS
 09/78 -ANNUAL REPORT COVERING IMPERIAL VALLEY AND ROOSEVELT HOT SPRINGS
 09/79 -ANNUAL REPORT COVERING IMPERIAL VALLEY AND ROOSEVELT HOT SPRINGS
 09/80 -DEVELOPMENT OF MONITORING STRATEGY
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: REC-002946 SSIE-ZMA 1058 TASK-J624B-61 AP -624B
 DU -L110 LABT-MTS

ABSTRACT.....: OBJECTIVE: BIOLOGICAL SAMPLES ARE COLLECTED AT GEOTHERMAL SITES AND ANALYZED FOR SELECTED ELEMENTS. THE OBJECTIVES WILL BE TO (1) PROVIDE BASELINE INFORMATION PRIOR TO FULL SCALE ENERGY PRODUCTION AND (2) TO EXAMINE THE FEASIBILITY OF USING ANIMALS AS BIOLOGICAL MONITORS FOR GEOTHERMAL POLLUTANTS. RODENTS, RABBITS, CHICKENS AND BEEF CATTLE REPRESENT VARIOUS ASPECTS OF THE FIELD SAMPLING PROGRAM. THE RELATIVE ABUNDANCE/DENSITY OF VARIOUS WILDLIFE SPECIES IS ALSO BEING INVESTIGATED. APPROACH: FIELD COLLECTED SAMPLES ARE TRANSPORTED BACK TO LAS VEGAS AND WILL BE ANALYZED FOR SUCH ELEMENTS AS LEAD, ARSENIC, ZINC, AND CADMIUM. CONCURRENT LABORATORY STUDIES ARE DESIGNED TO CONFIRM TISSUE RETENTION CHARACTERISTICS (OR COMPLICATING HOMEOSTATIC FACTORS) FOR GEOTHERMAL ELEMENTS FOLLOWING QUANTITATED ORAL EXPOSURES. THESE LABORATORY EXPERIMENTS SERVE AS AN ESSENTIAL PART OF THE QUALITY ASSURANCE EFFORT AND THE LABORATORY GENERATED SAMPLES WILL BE ANALYZED BY THOSE TECHNIQUES USED FOR THE FIELD COLLECTED TISSUES. OUTPUTS: SAMPLES HAVE BEEN COLLECTED FROM ROOSEVELT HOT SPRINGS, UTAH AND FROM IMPERIAL VALLEY, CALIFORNIA. RELATIVE ABUNDANCE WORK ON SMALL MAMMAL POPULATIONS AT ROOSEVELT HOT SPRINGS IS ALSO IN PROGRESS. ANALYTICAL DATA ON THE FIELD COLLECTIONS, AND ASSOCIATED LABORATORY STUDIES, ARE NOT AVAILABLE BUT SHOULD BE REPORTED NEXT YEAR.

****PROJECT: 02947-GEOTHERMAL ENVIRONMENTAL IMPACT ASSESSMENT - PLANTS AND SOILS**

STARTING/ COMPLETION DATE : 07/75 - 09/81 : FUNDING : ESTIMATED - FY77 / \$ 95700
 TASK CODE=J624B-62 **EPA= ** (IN-HO) PRIOR FY76 / \$ 126000
 IN-HOUSE EFFORT : FY 77 / 03.8 YEARS : TOTAL PROJECT 17.3
 EPA OFFICER.: DB GILMORE EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: KW BROWN US EPA
 GB WIERSMA US EPA
 AB CROCKETT US EPA
 MILESTONES....: 05/77 -BASELINE SAMPLING FOR SOIL AND VEGETATION AT FOUR KGRA'S IN THE I
 09/77 -ANNUAL REPORT - BASELINE TRACE ELEMENT LEVELS, IMPERIAL VALLEY
 09/77 -ANNUAL REPORT - BASELINE STUDIES AT ROOSEVELT HOT SPRINGS
 09/78 -POST OPERATIONAL REPORT - IMPERIAL VALLEY
 09/79 -POST OPERATIONAL REPORT - ROOSEVELT HOT SPRINGS
 09/81 -FINAL REPORT - IMPERIAL VALLEY
 09/81 -FINAL REPORT - ROOSEVELT HOT SPRINGS
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: RECN-002947 SSIE-ZMA 1055 TASK-J624B-62 AP -624B
 DU -L110 LABT-MTS
 ABSTRACT.....: OBJECTIVE: CONDUCT ENVIRONMENTAL ASSESSMENT OF GEOTHERMAL ENERGY EXTRACTION ACTIVITIES BY STUDYING
 POLLUTANT LEVELS AND POPULATION CHARACTERISTICS IN PREOPERATIONAL AND POST OPERATIONAL MODES.
 APPROACH: SOIL AND PLANT SAMPLES WILL BE COLLECTED PRIOR TO GEOTHERMAL POWER PLANT OPERATION TO
 ASSESS BASELINE LEVELS OF POLLUTANTS. SAMPLES WILL ALSO BE COLLECTED AFTER POWER PLANT OPERATION.
 IN ADDITION, CHARACTERISTICS OF PLANT POPULATIONS WILL BE ASCERTAINED SUCH AS SPECIES MIX AND
 BIOMASS. TWO DISTINCT ECOTYPES WILL BE STUDIED. ONE IS AN INTENSIVE AGRICULTURAL AREA IN THE
 IMPERIAL VALLEY OF SOUTHERN CALIFORNIA AND THE OTHER A RANGE LAND AREA NEAR ROOSEVELT HOT SPRINGS,
 UTAH. OUTPUT: PLANT AND SOIL SAMPLING HAS BEEN CONDUCTED AT FOUR KGRA'S IN THE IMPERIAL VALLEY AND
 ONE KGRA AT ROOSEVELT HOT SPRINGS. AA ANALYSES OF SAMPLES HAS BEGUN.

****PROJECT: 02948-MONITORING GUIDES FOR H2S AND NON-CONDENSIBLE HAZARDOUS GASEOUS EMISSIONS/GEOTHERMAL SYSTEMS**

STARTING/ COMPLETION DATE : 09/75 - 12/79 : FUNDING : ESTIMATED - FY77 / \$ 134300
 TASK CODE=J624B-63 **EPA= ** (IN-HO) PRIOR FY76 / \$ 65000
 IN-HOUSE EFFORT : FY 77 / 01.0 YEARS : TOTAL PROJECT 02.0
 EPA OFFICER.: DB GILMORE EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: W ADAMS US EPA
 MILESTONES....: 09/75 -FIRST GEOTHERMAL WORKSHOP
 10/76 -COMPLETION OF INITIAL INVESTIGATION WITH AIR MONITORING LABORATOR
 02/77 -SECOND GEOTHERMAL WORKSHOP
 04/77 -COMPLETION OF SECOND ROUND OF AIR MONITORING AT 4 SITES IN THE IM
 10/77 -INITIATE COLLECTION OF CONTINUOUS METEOROLOGICAL AND AIR QUALITY
 04/78 -COMPLETION OF FINAL ROUND OF AIR MONITORING AT 4 SITES IN THE IMP
 12/79 -REPORT ON AIR MONITORING STRATEGY AROUND GEOTHERMAL SITES
 PLAN ID.....: (AP-624B)(DU-L110) ENVIRONMENTAL ASPECTS OF ENERGY CONSERVATION/ADVANCED ENERGY
 ORDIS CODES...: RECN-002948 SSIE-ZMA 1064 TASK-J624B-63 AP -624B
 DU -L110 LABT-MTS
 ABSTRACT.....: OBJECTIVE: TO DEVELOP A STRATEGY FOR AIR QUALITY MONITORING AS PART OF AN INTEGRATED GEOTHERMAL
 MONITORING METHODOLOGY FOR EVALUATING THE TOTAL IMPACT OF GEOTHERMAL DEVELOPMENT ON A GIVEN
 LOCALITY. APPROACH: THE DESIGN OF A MONITORING NETWORK IS ACCOMPLISHED IN TWO PHASES. FIELD
 MEASUREMENTS OF AMBIENT AIR QUALITY WILL BE MADE AND AIR QUALITY SIMULATIONS WILL BE MADE FOR
 PREDICTING TEMPORAL AND SPATIAL DISTRIBUTIONS OF POLLUTANTS FOR VARIOUS STAGES OF GEOTHERMAL
 DEVELOPMENT. BECAUSE METEOROLOGICAL AND AIR QUALITY DATA FOR THIS AREA ARE SPARSE, A TWO YEAR FIELD
 PROGRAM IS NECESSARY TO DOCUMENT AEROMETRIC DATA. A FIRST YEAR EFFORT WOULD BE A PILOT STUDY FOR
 COLLECTING METEOROLOGICAL DATA AT SEVERAL SITES. LIMITED AIR QUALITY DATA WILL ALSO BE COLLECTED
 DURING THE FIRST YEAR. DATA FROM THE FIRST YEAR WILL BE USED AS A GUIDE TO DETERMINE THE LEVEL OF
 EFFORT FOR AN EXPANDED NETWORK IN THE SECOND YEAR. THESE DATA WILL BE USED AS A BASIS FOR THE AIR
 QUALITY SIMULATION PHASE OF THE PROJECT. OUTPUTS: COMPLETION OF INITIAL INVESTIGATION WITH AIR
 MONITORING LABORATORY AT 5 SITES IN THE IMPERIAL VALLEY, CALIFORNIA (10/76); COMPLETION OF SECOND
 ROUND OF AIR MONITORING AT 4 SITES IN THE IMPERIAL VALLEY, CALIFORNIA (4/77); INITIATE COLLECTION
 OF CONTINUOUS METEOROLOGICAL AND AIR QUALITY DATA AT FIXED SITES NEAR ROOSEVELT HOT SPRINGS, UTAH
 (10/77); COMPLETION OF FINAL ROUND OF AIR MONITORING AT 4 SITES IN THE IMPERIAL VALLEY (4/78);
 REPORT ON AIR MONITORING STRATEGY AROUND GEOTHERMAL SITES (12/79).

****PROJECT: 00520-TECHNOLOGY ASSESSMENT OF ENERGY DEVELOPMENT IN APPALACHIA**

STARTING/ COMPLETION DATE : 06/77 - 07/80 : FUNDING : ESTIMATED - FY77 / \$ 400000
 TASK CODE=B624C-594 **EPA=68-03-2531 ** (CNTR.) PRIOR FY76 / \$ 447000

EPA OFFICER.: VF JELEN EPA/IERL - CINC
 INVESTIGATOR.: RW COBB BATTELLE MEMORIAL INST
 RF AYERS BATTELLE MEMORIAL INST
 AN CHRISTAKIS BATTELLE MEMORIAL INST
 BG MAIDEN BATTELLE MEMORIAL INST
 TJ THOMAS BATTELLE MEMORIAL INST
 GA WATKINS BATTELLE MEMORIAL INST

MILESTONES....: 03/77 -FUNDING PACKAGE SUBMITTED
 06/77 -CONTRACT AWARDED
 08/78 -REPORT OF FIRST PHASE I
 11/78 -WORK PLAN FOR PHASE II
 07/80 -FINAL REPORT RECEIVED

PLAN ID.....: (AP-624C)(DU-L110) ENERGY-INTERGRATED ASSESSMENT
 ORDIS CODES...: RECN-000520 SSIE-GMA 3697 EPA -68-03-2531 TASK-B624C-594
 AP -624C DU -L110 LABT-EMI

ABSTRACT.....: THE PURPOSE OF THIS PROGRAM IS TO PROVIDE EPA AND OTHER DECISION MAKERS WITH INFORMATION NECESSARY
 (1) TO FORESEE THE EFFECTS OF REGULATORY POLICIES UPON FUTURE ENERGY DEVELOPMENT IN APPALACHIA AND
 (2) TO DETERMINE AREAS REQUIRING RESEARCH EMPHASIS IN PREPARATION FOR MONITORING AND CONTROLLING
 THE IMPACTS OF NEW OR EXPANDED ENERGY TECHNOLOGIES. THIS REGIONAL STUDY OF ENERGY DEVELOPMENT IN
 APPALACHIA WILL FOCUS ON ENVIRONMENTAL, SOCIAL, AND ECONOMIC IMPACTS, BOTH BENEFICIAL AND ADVERSE,
 ASSOCIATED WITH ALTERNATIVE ENERGY POLICIES AND PRACTICES. ALTHOUGH THE EMPHASIS WILL BE ON THE
 DEVELOPMENT OF APPALACHIAN COAL RESOURCES, OTHER ENERGY RESOURCES WILL ALSO BE EXAMINED. THE FIRST
 YEAR TECHNOLOGY ASSESSMENT WILL BEGIN BY REVIEWING EXISTING LITERATURE ON APPALACHIAN ENERGY
 DEVELOPMENT. ENERGY DEVELOPMENT SCENARIOS WILL BE FORMULATED BASED ON (1) NATIONAL ENERGY POLICY AS
 IT RELATES TO APPALACHIA AND (2) EXISTING ENERGY PRODUCTION TECHNOLOGY THAT IS EXPECTED TO BE USED
 TO 1985 (NEAR-TERM DEVELOPMENT) AS WELL AS EXISTING AND NEW TECHNOLOGY WHICH CAN BE EXPECTED TO BE
 AVAILABLE FOR USE BETWEEN 1985 AND 2000 (MID-TERM DEVELOPMENT). NEXT THE DIRECT AND HIGHER-ORDER
 IMPACTS FROM THE IMPLEMENTATION OF THIS TECHNOLOGY WILL BE EXAMINED. CONCURRENTLY, POLICY OPTIONS
 AVAILABLE FOR CONTROLLING THE IMPACTS WILL BE INVESTIGATED ALONG WITH ISSUES THAT IMPACTS RAISE.
 EMPHASIS WILL BE PLACED ON INVESTIGATING THE IMPACTS FROM CURRENT PLANS FOR ENERGY DEVELOPMENT
 UNDER EXISTING OR PROPOSED ENVIRONMENTAL PROTECTION POLICIES. THE SECOND PHASE WILL EXPAND UPON AND
 REFINES THE WORK OF THE FIRST YEAR TECHNOLOGY ASSESSMENT. EMPHASIS WILL BE PLACED UPON IDENTIFYING
 AND ANALYZING ALTERNATIVE STRATEGIES FOR MANAGING THE RATE AND PATTERN OF ENERGY DEVELOPMENT IN
 APPALACHIA.

****PROJECT: 04013-TECHNOLOGY ASSESSMENT OF WESTERN ENERGY RESOURCE DEVELOPMENT**

STARTING/ COMPLETION DATE : 07/75 - 07/79 : FUNDING : ESTIMATED - FY77 / \$ 200000
 TASK CODE=V624C-01 **EPA=68-01-1916 ** (CNTR.) PRIOR FY76 / \$ 470000

EPA OFFICER.: S PLOTKIN EPA/HOQTRS- DEMI
 INVESTIGATOR.: IL WHITE UNIV OF OKLAHOMA GRADUATE SCH/POL SCI DEPT

MILESTONES....: 03/76 -COMPLETION, PUBLICATION OF WORK PLAN
 08/76 -PUBLICATION OF PHASE I REPORT, ENERGY FROM THE WEST
 03/76 -PUBLICATION OF FINAL IMPACT ASSESSMENT REPORT
 01/79 -PUBLICATION OF SERIES OF POLICY-ORIENTED FINAL REPORTS

PLAN ID.....: (AP-624C)(DU-L110) ENERGY-INTERGRATED ASSESSMENT
 ORDIS CODES...: RECN-004013 SSIE-GMA 4333 EPA -68-01-1916 TASK-V624C-01
 AP -624C DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES - TO IDENTIFY A BROAD RANGE OF DESIRABLE AND UNDESIRABLE CONSEQUENCES LIKELY TO RESULT
 FROM THE DEVELOPMENT OF WESTERN U. S. ENERGY RESOURCES (COAL, OIL SHALE, URANIUM, GEOTHERMAL, OIL,
 NATURAL GAS); TO IDENTIFY, EVALUATE, AND COMPARE POLICIES THAT WILL PROMOTE DESIRABLE CONSEQUENCES
 AND ELIMINATE OR REDUCE UNDESIRABLE ONES; AND TO IDENTIFY CRITICAL RESEARCH PROJECTS WHICH WILL
 ENHANCE THE ABILITY OF ALL LEVELS OF GOVERNMENT TO MAKE OPTIMAL DECISIONS ABOUT FUTURE ENERGY
 DEVELOPMENT IN THE WEST. APPROACH - THE ANALYSIS INCLUDES A SERIES OF IMPACT ASSESSMENTS WHICH
 EXAMINE THE PHYSICAL AND SOCIAL/CULTURAL/ECONOMIC IMPACTS OF DEVELOPMENT AT SIX SITES AND THE
 REGION AS A WHOLE. THESE IMPACT ASSESSMENTS ARE USED, IN COMBINATION WITH EXTENSIVE CONTACTS WITH
 DECISIONMAKERS AND OTHER INDIVIDUALS AND GROUPS AFFECTED BY AND CONCERNED WITH WESTERN ENERGY
 DEVELOPMENT, TO IDENTIFY CRITICAL PROBLEMS AND ISSUES WHICH ARE THEN EXAMINED IN MORE DETAIL. A
 CRITICAL PART OF THIS FOLLOW-UP ANALYSIS IS TO IDENTIFY THE INSTITUTIONAL AND POLITICAL CONTEXT IN
 WHICH THE IMPACTS ARE EVALUATED AND DEALT WITH, IN ORDER TO PINPOINT SITUATIONS WHERE THE PRESENT
 REGULATORY, INSTITUTIONAL, OR POLITICAL SYSTEM CANNOT PROPERLY DEAL WITH IMPACTS AND TO IDENTIFY
 APPROPRIATE SOLUTIONS TO THESE SHORTCOMINGS. CURRENT PLANS AND/OR PROGRESS - A PHASE I REPORT
 (ENERGY FROM THE WEST) DEALING PRINCIPALLY WITH IMPACT ASSESSMENT HAS BEEN PUBLISHED. THE REMAINING
 WORK WILL FOCUS ON POLICY ANALYSIS OF CRITICAL PROBLEMS AND ISSUES, WITH SOME EFFORT AT EXPANDING
 THE TECHNOLOGIES EXAMINED AND COMPLETING SOME DETAILS OF THE IMPACT ASSESSMENTS.

****PROJECT: 04031-DEVELOP ECONOMIC PROJECTION MODELING CAPABILITY NECESSARY TO DERIVE
MODULAR ENERGY & ENVIRONMENTAL PLANNING MODELS AT A MULTICOU**

STARTING/ COMPLETION DATE : 05/75 - 00/80 : FUNDING : ESTIMATED - FY77 / \$ 74000
TASK CODE=V624C-55 **EPA=D6-E721-DU ** (IAG) PRIOR FY76 / \$ 160000
EPA OFFICER.: MW BLOCH EPA/HDOTRS- OEMI DIV OF NAV DEV & REG STUDIES
INVESTIGATOR.: H MINOTE US TENNESSEE VALLEY AUTH
PLAN ID..... (AP-624C)(DU-L110) ENERGY-INTERGRATED ASSESSMENT TASK-V624C-55
ORDIS CODES...: RECN-004031 SSIE-GMA 2932 1 EPA -D6-E721-DU
AP -624C DU -L110 LABT-EMI

ABSTRACT..... AS A PART OF ITS ONGOING ECONOMIC RESEARCH PROGRA, TVA IS IN THE PROCESS OF DEVELOPING A REGIONAL ECONOMIC MODEL OF THE TVA REGION AND ITS PRINCIPAL SUBREGIONS. LONG-TERM OBJECTIVES IN THE DEVELOPMENT OF THE MODEL INCLUDE (1) PROVISION OF AN ANNUAL AND CONSISTENT SET OF LONG-RUN ECONOMIC AND DEMOGRAPHIC PROJECTIONS WHICH REFLECT THE NATIONAL BUSINESS CYCLE; (2) ASSESSMENT OF REGIONAL SENSITIVITY TO NATIONAL ECONOMIC PARAMETERS SUCH AS GROWTH OR DECLINE IN SPECIFIC INDUSTRIES; (3) ASSESSMENT OF THE IMPACT IN SMALL AREAS (MULTICOUNTY) OF A MAJOR CONSTRUCTION PROJECTS, E.G., A LARGE NUCLEAR ENERGY-GENERATING PLANT; AND (4) PROVISION OF A MACROECONOMIC DATA BASE AT A MULTICOUNTY LEVEL FOR LAND-USE PLANNING AND SITE ASSESSMENT. AT THE PRESENT STAGE OF DEVELOPMENT, AN OPERATIONAL MODEL HAS BEEN DEVELOPED FOR THE TVA POWER SERVICE AREA; AND IT IS BEING USED IN DEVELOPING THE TVA POWER SYSTEM LOAD FORECAST. THE OPERATIONAL MODEL CONSISTS OF TWO PRINCIPAL COMPONENTS: (1) A POPULATION-LABOR FORCE-HOUSEHOLD SUBMODEL AND (2) AN EMPLOYMENT SUBMODEL. OUTPUT OF THE CURRENT MODEL FOR THE POWER SERVICE AREA CONSISTS OF POPULATION BY AGE (SIX CATEGORIES) AND RACE (TWO CATEGORIES), NET MIGRATION, LABOR FORCE, HOUSEHOLDS AND EMPLOYMENT IN 20 MANUFACTURING CATEGORIES AND FIVE NONMANUFACTURING CATEGORIES. A PHASE I REPORT ON THIS WORK WILL BE ISSUED BY 3/78. PLANNED DEVELOPMENT OF THE MODEL CONSISTS OF THE FOLLOWING TASKS: (1) EXPAND THE NUMBER OF EMPLOYMENT CATEGORIES IN THE NONMANUFACTURING SECTOR; (2) DEVELOP A PERSONAL INCOME SUBMODEL; (3) ADAPT THE MODEL TO QUANTIFY IMPACTS AT A MULTICOUNTY LEVEL (BEA AREA) ON POPULATION, LABOR FORCE, EMPLOYMENT, ETC., OF A MAJOR CONSTRUCTION PROJECT; (4) DEVELOP AND ADD TO THE MODEL AN ALGORITHM FOR ALLOCATING MULTICOUNTY PROJECTIONS TO SMALLER AREAS; AND (5) DEVELOP DATA AND METHODOLOGIES FOR IDENTIFYING GROWTH DIFFERENTIALS BETWEEN COUNTIES OR GROUPS OF COUNTIES AS CHANGES IN GROWTH RELATE TO LOCAL CAPACITY FOR ACCOMMODATING SOCIOECONOMIC IMPACTS.

****PROJECT: 04033-ENVIRONMENTAL RESIDUALS OUTPUT MODEL FOR OPERATION AND EXPANSION OF AN
ELECTRIC POWER SYSTEM**

STARTING/ COMPLETION DATE : 05/75 - 12/77 : FUNDING : ESTIMATED - FY77 / \$ 0
TASK CODE=V624C-56 **EPA=D5-E721-DV ** (IAG) PRIOR FY76 / \$ 126000
EPA OFFICER.: MW BLOCH EPA/HDOTRS- OEMI
INVESTIGATOR.: BD EVANS US TVA
D WALTERS US TVA
PLAN ID..... (AP-624C)(DU-L110) ENERGY-INTERGRATED ASSESSMENT TASK-V624C-56
ORDIS CODES...: RECN-004033 SSIE-GMA 4679 EPA -D5-E721-DV
AP -624C DU -L110 LABT-EMI

ABSTRACT..... THE TENNESSEE VALLEY AUTHORITY HAS DEVELOPED AN ENVIRONMENTAL RESIDUALS OUTPUT MODEL TO PREDICT AMOUNTS OF RESIDUALS PRODUCED BY DIFFERENT CONFIGURATIONS OF A POWER SYSTEM. FUTURE LOAD DATA IS OBTAINED ON A PLANT-BY-PLANT BASIS FROM A POWER SYSTEM SIMULATION MODEL. THIS SIMULATION DETAILS COMPLEX FUNCTIONAL RELATIONSHIPS AMONG POWER PLANT INPUT-OUTPUT ENERGIES, POWER LEVELS, AND OTHER GENERATING UNIT CHARACTERISTICS. TRANSFORM EQUATIONS IN THE ENVIRONMENTAL RESIDUALS OUTPUT MODEL PROVIDE ESTIMATES OF FLY ASH AND SULFUR DIOXIDE EMISSIONS. THE MODEL'S PREDICTIVE ABILITY WAS DEMONSTRATED WITH HISTORICAL DATA, AND THE MODEL PROVIDES A FIRST ESTIMATE OF RELATIVE ENVIRONMENTAL IMPACT. WORK HAS BEEN COMPLETED ON THE ENVIRONMENTAL RESIDUAL OUTPUT MODEL AND ITS DOCUMENTATION.

****PROJECT: 04035-DEMONSTRATE THE APPLICATION OF COMPUTER GRAPHICS TO SITE-SPECIFIC AND
REGIONAL INTEGRATED ENVIRONMENTAL ASSESSMENT OF ENERGY SYSTE**

STARTING/ COMPLETION DATE : 06/75 - 06/80 : FUNDING : ESTIMATED - FY77 / \$ 164000
TASK CODE=V624C-57 **EPA=D5-E721-DW ** (IAG) PRIOR FY76 / \$ 314000
EPA OFFICER.: MW BLOCH EPA/HDOTRS- OEMI DIV OF ENV PLANNING
INVESTIGATOR.: MC BABB US TENNESSEE VALLEY AUTH DIV OF ENV PLANNING
HR HICKEY US TENNESSEE VALLEY AUTH DIV OF ENV PLANNING
DE HOUGHINS US TENNESSEE VALLEY AUTH
MILESTONES...: 02/78 -MAJOR REPORT
PLAN ID..... (AP-624C)(DU-L110) ENERGY-INTERGRATED ASSESSMENT TASK-V624C-57
ORDIS CODES...: RECN-004035 SSIE-GMA 2948 1 EPA -D5-E721-DW
AP -624C DU -L110 LABT-EMI

ABSTRACT..... OBJECTIVES: DEVELOP AND DEMONSTRATE WAYS IN WHICH COMPUTER GRAPHICS CAN BE USED TO IMPROVE OR FACILITATE ENVIRONMENTAL ANALYSES PROCEDURES. APPROACH: METHODS ARE BEING DEVELOPED WHICH UTILIZE THE ABILITY OF COMPUTER GRAPHICS TO (A) IMPROVE THE INTERACTION BETWEEN THE ENGINEER/SCIENTIST AND THE POWER OF THE COMPUTER AND (B) PROVIDE AN EFFECTIVE MEANS FOR COMMUNICATING COMPLEX ENVIRONMENTAL IMPACT INFORMATION AND POLLUTION CONTROL ALTERNATIVES. CURRENT PLANS/PROGRESS: TWO YEARS OF RESEARCH HAVE BEEN COMPLETED EXPLORING THE USE OF STORAGE-TUBE GRAPHICS TECHNOLOGY. IT HAS BEEN FOUND THAT FOR MANY TYPES OF ANALYSIS A SIGNIFICANT SAVINGS OF TIME AND COST CAN BE ACHIEVED OVER THE USE OF CONVENTIONAL MANUAL METHODS. ANALYSIS APPLICATIONS HAVE BEEN DEVELOPED FOR AIR AND WATER QUALITY STUDIES, INDUSTRIAL AND RADIOLOGICAL HYGIENE, SOCIOECONOMIC IMPACT ANALYSIS AND FACILITIES SITING USING GEOGRAPHICALLY REFERENCED DATA. CURRENTLY, INVESTIGATION IS PROCEEDING INTO THE USE OF STAND-ALONE, INTERACTIVE GRAPHICS SYSTEMS WITH REFRESHED DISPLAY CAPABILITIES FOR ENVIRONMENTAL APPLICATIONS. A MILESTONE REPORT PUBLISHED 02/78.

Flue Gas Sulfur Oxide Control

****PROJECT: 01514-WELLMAN-LORD/ALLIED FGD DEMONSTRATION TEST PROGRAM**

STARTING/ COMPLETION DATE : 03/75 - 02/79 : FUNDING : ESTIMATED - FY77 / \$ 558308
 TASK CODE=F624A-034 **EPA=68-02-1877 ** (CNTR.) PRIOR FY76 / \$ 774000
 EPA OFFICER.: WH PONDER EPA/IERL - RTP
 INVESTIGATOR.: RC ADAMS THOMPSON RAMO WOOLDRIDGE INC
 MILESTONES...: 03/75 -CONTRACT AWARD
 03/76 -PREPARE TEST PLAN
 10/77 -BEGIN TEST PROGRAM
 10/78 -COMPLETE TEST PROGRAM
 02/79 -COMPLETE FINAL REPORT
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001514 SSIE-GMA 4631 EPA -68-02-1877 TASK-F624A-034
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: TRW, INC. WILL FURNISH THE NECESSARY PERSONNEL, MATERIALS, SERVICES, EQUIPMENT, AND FACILITIES NECESSARY FOR OR INCIDENT TO THE PERFORMANCE OF THE THREE MAJOR TASKS DESCRIBED BELOW: 1. PREPARATION OF DEMONSTRATION TEST PLAN - TRW INC. WILL PREPARE AND SUBMIT FOR APPROVAL A DEMONSTRATION TEST PLAN BASED ON THE PRELIMINARY PLANS CONTAINED IN SECTIONS 4.1, 4.2, 4.5, AND 4.6 OF THE WORK PLAN MANUAL -TEST AND EVALUATION PROGRAM FOR THE NIPSCO/DAVY/ALLIED DEMONSTRATION PLANT, DATED 31 AUGUST 1973. THE DEMONSTRATION TEST PLAN WILL INCLUDE A THOROUGH DISCUSSION OF TEST PARAMETERS, SAMPLING METHODS, INSTRUMENTATION, ANALYTICAL METHODS, SCHEDULE, MANPOWER, COSTS, DATA COLLECTION, REDUCTION, AND PRESENTATION. INSTALLATION AND CHECKOUT OF TEST MEASUREMENTS EQUIPMENT, WHICH WAS INITIATED UNDER TASK 1B OF CONTRACT NO. 68-02-0235, WILL BE CONTINUED DURING PREPARATION OF THE DEMONSTRATION TEST PLAN. 2. PERFORM ACCEPTANCE TEST - TRW, INC. WILL OBTAIN ACCEPTANCE TEST MEASUREMENTS DURING THE ONE-YEAR DEMONSTRATION OPERATION OF THE WELLMAN-LORD/ALLIED SYSTEM AT NIPSCO. THE PROCEDURES, METHODS, SCHEDULES, ETC., WILL BE IN ACCORDANCE WITH THE APPROVED ACCEPTANCE TEST PLAN PREPARED DURING TASK 16 TO CONTRACT NO. 68-02-0235. 3. PERFORM ONE-YEAR DEMONSTRATION TEST - TRW INC. WILL OBTAIN TEST MEASUREMENTS DURING THE ONE-YEAR DEMONSTRATION OPERATION OF THE WELLMAN-LORD/ALLIED SYSTEM AT NIPSCO. THE PROCEDURES, METHODS, SCHEDULES, ETC., WILL BE IN ACCORDANCE WITH THE APPROVED DEMONSTRATION TEST PLAN PREPARED DURING TASK 1 OF THIS CONTRACT. TRW, INC. WILL COLLECT, REDUCE AND EVALUATE DEMONSTRATION DATA AND PREPARE A REPORT WHICH WILL SERVE AS A FINAL REPORT

****PROJECT: 01528-PROTOTYPE STUDY OF LIME/LIMESTONE SCRUBBERS FOR SO2 AND DUST REMOVAL**

ADVANCED TESTING AND DATA EVALUATION

STARTING/ COMPLETION DATE : 07/74 - 02/78 : FUNDING : ESTIMATED - FY77 / \$ 486714
 TASK CODE=F624A-045 **EPA=68-02-1814 ** (CNTR.) PRIOR FY76 / \$ 2108507
 EPA OFFICER.: JE WILLIAMS EPA/IERL - RTP
 INVESTIGATOR.: HN HEAD BECHTEL NATIONAL INC
 GH DYER BECHTEL NATIONAL INC
 SC WANG BECHTEL NATIONAL INC
 RM SHERWIN BECHTEL NATIONAL INC
 RT KEEN BECHTEL NATIONAL INC
 AH ABDULSATTAR BECHTEL NATIONAL INC
 MILESTONES...: 09/75 -PUBLISH FIRST PROGRESS REPORT
 09/75 -CONDUCT INDUSTRY BRIEFING CONFERENCE
 09/76 -PUBLISH SECOND PROGRESS REPORT
 10/76 -CONDUCT INDUSTRY BRIEFING CONFERENCE
 09/77 -PUBLISH THIRD PROGRESS REPORT
 02/78 -COMPLETE TESTING
 05/78 -CONDUCT INDUSTRY BRIEFING CONFERENCE
 05/78 -PUBLISH FINAL REPORT
 06/78 -COMPLETE DESIGN/ECONOMIC STUDY COMPUTER PROGRAM
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001525 SSIE-GMA 4161 EPA -68-02-1814 TASK-F624A-045
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: BASED ON THE RESULTS OF THE PHASE III TEST PROGRAM UNDER PREDECESSOR CONTRACT PH 22-68-67, AND OTHER SUPPORTING PROGRAMS OF EPA, BECHTEL IS PERFORMING AN EXTENDED TESTING PROGRAM AT THE EPA ALKALI SCRUBBING TEST FACILITY, TVA SHAWNEE STEAM PLANT, PADUCAH, KENTUCKY, FOR THE REMOVAL OF SO2 AND ASH PARTICULATE FROM COAL-FIRED FURNACE GAS. THE TEST FACILITY CONSISTS OF TWO PARALLEL SCRUBBER SYSTEMS - VENTURI FOLLOWED BY A SPRAY TOWER AND A TURBULENT CONTACT ABSORBER. EACH SYSTEM IS CAPABLE OF TREATING APPROXIMATELY 10 MW EQUIVALENT (30,000 ACFM AT 300 DEGREES F) OF FLUE GAS CONTAINING 1,800-4,000 PPM SULFUR DIOXIDE AND 2 TO 5 GRAINS/SCF OF PARTICULATES. THE SCRUBBERS ARE INTEGRATED INTO THE FLUE GAS EXHAUST DUCTWORK OF BOILER NO. 10. THE MAJOR GOALS OF THE OVERALL TEST PROGRAM ARE (1) TO CHARACTERIZE THE EFFECT OF IMPORTANT PROCESS VARIABLES ON SULFUR DIOXIDE AND PARTICULATE REMOVAL, (2) TO DEVELOP MATHEMATICAL MODELS FOR ECONOMIC SCALE-UP TO FULL-SIZE SCRUBBER FACILITIES, (3) TO DEMONSTRATE RELIABILITY, AND (4) TO DEMONSTRATE PROCESS AND EQUIPMENT VARIATIONS TO IMPROVE THE ECONOMICS OF LIME/LIMESTONE SCRUBBING. THE PROCESS IMPROVEMENT OBJECTIVES OF THE CURRENT PROGRAM ARE TO IMPROVE (1) ALKALI UTILIZATION, (2) SO2 REMOVAL, (3) SLUDGE DISPOSAL PROPERTIES, AND (4) SYSTEM RELIABILITY. SPECIFIC TASKS TO BE PERFORMED ARE: LIMESTONE/LIME ADVANCED TESTING, SLUDGE FIXATION STUDIES, AND ECONOMIC STUDIES.

****PROJECT: 01527-SULFUR DIOXIDE OXIDATION IN SCRUBBER SYSTEMS**

STARTING/ COMPLETION DATE : 07/77 - 06/79 : FUNDING : ESTIMATED - FY77 / \$ 79641
 TASK CODE=F624A-046 **EPA=R805227-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: RH BORGWARDT EPA/IERL - RTP
 INVESTIGATOR.: JL HUDSON UNIV OF VIRGINIA
 MILESTONES....: 09/77 -CONSTRUCT REACTOR AND ASSEMBLE APPARATUS
 11/77 -LOW LEVEL CATALYST STUDIES IN FLOW REACTOR
 02/78 -BISULFITE OXIDATION IN BATCH REACTOR
 06/78 -BISULFITE OXIDATION WITH MULTIPLE CATALYSTS
 09/78 -EFFECT OF OXIDATION INHIBITORS
 10/78 -CONCENTRATION EFFECTS
 09/78 -DEVELOP MODEL FOR OXIDATION IN SLURRIES
 06/79 -VERIFY MODEL
 08/79 -FINAL REPORT

ENG & APPL SCI/CHEM ENG DEPT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001527 SSIE-GMA 4127 EPA -R805227-01 TASK-F624A-046
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES: 1) TO INVESTIGATE THE EFFECT OF CONTROLLABLE SYSTEM PARAMETERS IN LIME/LIMESTONE
 SCRUBBING SYSTEMS IN ORDER TO SUGGEST METHODS OF LIMITING OXIDATION TO PERMIT UNSATURATED
 OPERATION. SYSTEM PARAMETERS INCLUDE THE CONCENTRATION AND TYPE OF INHIBITORS AND CATALYSTS AS WELL
 AS PHYSICAL FACTORS WHICH CONTROL MASS TRANSFER. 2) TO INVESTIGATE THE POSSIBILITY OF MAXIMIZING
 THE EFFICIENCY OF OXIDATION IN A HOLD TANK WHEN OXIDATION IS FORCED BY AERATION. FACTORS IMPORTANT
 HERE ARE MASS TRANSFER (PARTICULARLY AS INFLUENCED BY AIR BUBBLE SIZE AND CONTACT TIME) AND THE
 KINETICS OF THE OXIDATION REACTION. APPROACH: CHEMICAL KINETICS AND MASS TRANSFER WILL BE STUDIED
 IN BOTH CLEAR SOLUTIONS AND SLURRIES USING STIRRED REACTORS AND FLOW REACTORS IN BENCH SCALE
 EQUIPMENT. THE RESULTS WILL BE INCORPORATED INTO A MATHEMATICAL MODEL TO PRODUCE METHODS OF
 MINIMIZING OR MAXIMIZING OXIDATION IN SCRUBBERS. PLANS: CONSTRUCT REACTOR AND ASSEMBLE APPARATUS.
 STUDY OXIDATION OF BISULFITE AT PH 4-6 IN FLOW REACTOR AND BATCH REACTOR WITH SINGLE AND MULTIPLE
 CATALYSTS. EVALUATE OXIDATION INHIBITORS. STUDY OXIDATION OF SULFITE WITH HIGH CATALYST
 CONCENTRATIONS. DEVELOP MODEL FOR OXIDATION IN SLURRIES INCLUDING MASS TRANSFER AND KINETICS.

****PROJECT: 01547-DEMONSTRATION OF HIGH-EFFICIENCY/HIGH-THROUGHPUT BAGHOUSE**

STARTING/ COMPLETION DATE : 03/76 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 283989
 TASK CODE=F624A-060 **EPA=68-02-2148 ** (CNTR.) PRIOR FY76 / \$ 700000
 EPA OFFICER.: JH TURNER EPA/IERL - RTP
 INVESTIGATOR.: J MCKENNA ENVIRO SYSS & RES INC
 S PERRY FABRICS AMERICA CORP

MILESTONES....: 03/76 -CONTRACT AWARDED
 12/76 -BAGHOUSES ON LINE
 12/77 -REPORT ON FIRST YEAR'S OPERATION
 12/77 -REPORT ON SECOND YEAR'S OPERATION

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001547 SSIE-GMA 4155 EPA -68-02-2148 TASK-F624A-060
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES: EXAMINE TECHNICAL AND ECONOMIC ASPECTS OF SMALL, FULL-SCALE, REVERSE AIR BAGHOUSE
 OPERATED AT FILTRATION VELOCITIES UP TO 9 FPM ON A STOKER-FIRED INDUSTRIAL BOILER. APPROACH: A.
 OPERATE BAGHOUSE FOR A MINIMUM PERIOD OF 10 MONTHS USING NOMEX, GORE-TEX, TEFLON, AND DURALON T
 FABRICS. B. DETERMINE FABRIC PERFORMANCE AND LIFE. C. DETERMINE SYSTEM PERFORMANCE AND COSTS. D.
 RECORD ALL PERTINENT BOILER AND FILTER SYSTEM OPERATING PARAMETERS. E. CHARACTERIZE FLUE GAS
 STREAMS AND FLY ASH. CURRENT PLANS AND/OR PROGRESS: SYSTEM SCHEDULED TO START 12/76. OPTIONS
 INCLUDE TESTING ADDITIONAL FABRICS AND TESTING SO2 REMOVAL CAPABILITIES.

****PROJECT: 01579-DEVELOP COMPARATIVE ECONOMICS OF SO2 EMISSION CONTROL PROCESSES**

STARTING/ COMPLETION DATE : 05/75 - 02/80 : FUNDING : ESTIMATED - FY77 / \$ 300000
 TASK CODE=F624A-092 **EPA=D7-E721-BI ** (IAG) PRIOR FY76 / \$ 725000
 EPA OFFICER.: RD STERN EPA/IERL - RTP
 INVESTIGATOR.: GG MCGLAMERY US TVA
 SV TOMLINSON US TVA
 F KENNEDY US TVA
 JW BARRIER US TVA
 JD MAXWELL US TVA
 TA BURNETT US TVA
 JG PATTERSON US TVA

MILESTONES....: 03/80 -TASK I, PHASES I, II, AND III REPORTS
 02/78 -TASK IIA DRAFT FINAL REPORT OF SLUDGE STUDIES
 07/76 -TASK IIB, TRW REPORTS ON ALUMINA EXTRACTION PROCESS ON
 07/76 -ASSISTANCE TO EPA IN ANALYZING COST ESTIMATES OF STACK GAS EMISSIONS
 03/80 -TASK IV DRAFT INTERIM REPORTS FOR SELECTED FRONT END PROCESSES

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION TASK-F624A-092
 ORDIS CODES...: RECN-001579 SSIE-GMA 4695 EPA -D7-E721-BI
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: THE PRIMARY PURPOSE OF TASK I IS TO REVIEW RECENTLY DEVELOPED PROCESSES FOR DESULFURIZATION OF POWER PLANT STACK GASES; THEN, SYSTEMATICALLY SELECT AND EVALUATE THOSE WHICH HAVE THE GREATEST DEGREE OF DEVELOPMENT AND WHICH ARE POTENTIALLY ATTRACTIVE BOTH TECHNICALLY AND ECONOMICALLY. THESE EVALUATIONS WILL INCLUDE PREPARATION OF FLOWSHEET MATERIAL BALANCES, AND COMMERCIAL LAYOUTS; DEFINITION OF PROCESS EQUIPMENT; ESTIMATION OF PROCESS EQUIPMENT COSTS; PREPARATION OF CAPITAL INVESTMENTS AND OPERATING COSTS; AN ANALYSIS OF DESIGN AND ECONOMIC VARIABLES FOR COST SENSITIVITY. AS PART OF THE OVERALL EPA SLUDGE DISPOSAL PROGRAM, TASK IIA OF THIS PROJECT PROVIDES DESIGN AND COST STUDIES OF THE NUMEROUS SLUDGE DISPOSAL ALTERNATIVES. THE ECONOMIC AND TECHNICAL PREMISES FOR THESE COMPARISONS WILL BE ESTABLISHED AND SURVEYS OF COST STUDIES AND COST DATA FOR OPERATING AND PLANNED COMMERCIAL UNITS WILL BE MADE. TASK IIB WILL PROVIDE A REVIEW AND CRITIQUE OF A TRW CONCEPTUAL DESIGN COST STUDY FOR AN ALUMINA EXTRACTION PROCESS UTILIZING LIME-LIMESTONE SCRUBBER SLUDGE. TASK III IS A CONTINUING TASK OF PROVIDING INTERMITTENT ASSISTANCE TO EPA IN ANALYZING PUBLISHED COST ESTIMATES OF POWER PLANT STACK GAS EMISSION ABATEMENT SYSTEMS AND PREPARING BRIEF REPORTS OF CRITIQUE. TASK IV IS SIMILAR IN SCOPE TO TASK I EXCEPT THE STUDIES WILL COVER FRONT-END PROCESS ALTERNATIVES, SUCH AS COAL CONVERSION SYSTEMS AND COAL WASHING TECHNIQUES, TO STACK GAS TREATMENT FOR EMISSION CONTROL.

****PROJECT: 01580-ENERGY REQUIREMENT OPTIMIZATION STUDY OF SELECTED PROCESSES FOR REMOVING SO2 FROM POWER PLANT STACK GASES**

STARTING/ COMPLETION DATE : 01/75 - 01/79 : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=F624A-094 **EPA=D7-E721-BH ** (IAG) PRIOR FY76 / \$ 100000
 EPA OFFICER.: JH BLACK EPA/IERL - RTP
 INVESTIGATOR.: SV TOMLINSON US TVA
 RL TORSTRICK US TVA
 GG MCGLAMERY US TVA

MILESTONES....: 04/78 -PROJECT DEFINITIONS, INCLUDING PROCESSES TO BE STUDIED
 09/78 -BASE ENERGY REQUIREMENTS FOR SELECTED PROCESSES
 01/79 -DRAFT REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION TASK-F624A-094
 ORDIS CODES...: RECN-001580 SSIE-GMA 4694 EPA -D7-E721-BH
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: THE PRIMARY OBJECTIVES OF THE STUDY PROJECT ARE TO SUMMARIZE THE ENERGY REQUIREMENTS OF SELECTED POWER PLANT STACK GAS SO2 REMOVAL PROCESSES AND THEN PREPARE ECONOMIC AND FEASIBILITY ANALYSES OF PROCESS MODIFICATIONS FOR REDUCING AND OPTIMIZING THE ENERGY REQUIREMENTS FOR THE PROCESSES. CONCEPTUAL DESIGN AND COST STUDIES WILL BE SURVEYED FOR ENERGY REQUIREMENT DATA. ALSO A SURVEY WILL BE MADE OF THE ENERGY REQUIREMENT DATA FOR ANY EXISTING DEMONSTRATION AND COMMERCIAL UNITS. THE DATA OBTAINED FROM THESE SURVEYS WILL BE SUMMARIZED AND ANALYZED TO ESTABLISH A CURRENT BASE ENERGY REQUIREMENT LEVEL FOR EACH OF THE PROCESSES. FEASIBILITY AND ECONOMIC EVALUATIONS WILL THEN BE MADE OF PROCESS MODIFICATIONS AND VARIATIONS FOR REDUCING AND OPTIMIZING THE ENERGY REQUIREMENTS. PROCESS MODIFICATIONS AND VARIATIONS TO BE STUDIED WILL INCLUDE SUCH ITEMS AS SCRUBBER TYPE, REHEAT LEVEL AND TYPE, HEAT RECOVERY SYSTEMS, ETC. THE WORK ON THIS PROJECT HAS BEEN RESCHEDULED TO BEGIN IN THE FIRST QUARTER OF CY 1978. IT IS PLANNED FOR THE MAJOR WORK ON THIS PROJECT TO FOLLOW SEQUENTIALLY THE COMPLETION OF THE CURRENT PHASE OF THE SHAWNEE LIMESTONE-LIME SCRUBBING PROCESS COMPUTERIZED DESIGN-COS

****PROJECT: 01585-LIME/LIMESTONE AND ADVANCED CONCEPTS--TVA'S 1-MW PILOT PLANT (COLBERT)**

STARTING/ COMPLETION DATE : 05/75 - 03/77 : FUNDING : ESTIMATED - FY77 / \$ 0
 TASK CODE=F624A-104 **EPA-D5-E721-AZ ** (IAG) PRIOR FY75 / \$ 600000

EPA OFFICER.: JE WILLIAMS EPA/IERL - RTP
 INVESTIGATOR.: GA HOLLINDEN US TVA
 RF ROBARDS US TVA

MILESTONES.... 03/77 -PROJECT COMPLETED - FINAL REPORT ISSUED
 PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES.: RECN-001585 SSIE-GMA 4705 EPA -D5-E721-AZ TASK-F624A-104
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... PROJECT COMPLETED. FINAL REPORT ISSUED MARCH 1977 ENTITLED "TVA'S 1MW PILOT PLANT: FINAL REPORT ON HIGH VELOCITY SCRUBBING AND VERTICAL DUCT MIST ELIMINATION."

****PROJECT: 01581-DEVELOPMENT OF FLUE GAS DESULFURIZATION TECHNOLOGY--SHAWNEE LIME & LIMESTONE SCRUBBING PROGRAM**

STARTING/ COMPLETION DATE : 11/72 - 02/78 : FUNDING : ESTIMATED - FY77 / \$ 890000
 TASK CODE=F624A-096 **EPA-D7-E721-BL ** (IAG) PRIOR FY76 / \$ 488000

EPA OFFICER.: JE WILLIAMS EPA/IERL - RTP
 INVESTIGATOR.: AF LITTLE US TVA
 JR BOYD US TVA
 SB JACKSON US TVA
 TM KELSQ US TVA

MILESTONES.... 02/78 -COMPLETED LIMESTONE UTILIZATION TESTS
 11/76 -COMPLETED LIME/LIMESTONE SCRUBBING TESTS WITH NGO ADDITION
 02/77 -COMPLETED FLUE GAS CHARACTERIZATION TESTS
 10/77 -COMPLETED LIME/LIMESTONE TWO-STAGE FORCED-OXIDATION TESTS
 12/77 -COMPLETE RELIABILITY DEMONSTRATION RUNS
 02/78 -PROJECT COMPLETION

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES.: RECN-001581 SSIE-GMA 2986 1 EPA -D7-E721-BL TASK-F624A-096
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... CONCEPTUAL DESIGN AND ECONOMIC STUDIES AND PILOT-PLANT TESTS INDICATE THAT LIMESTONE WET SCRUBBING OFFERS GOOD PROMISE AS AN EFFECTIVE METHOD OF SO2 EMISSION CONTROL FOR STACK GASES AT LARGE COAL-FIRED POWER PLANTS. USING TWO 10-MW-SIZE SCRUBBER TRAINS, A PROTOTYPE-SCALE EVALUATION OF THE PROCESSES IS BEING CONDUCTED AT SHAWNEE STEAM PLANT (UNIT 10). THE PROJECT IS A JOINT EFFORT OF TVA, EPA, AND BECHTEL CORPORATION. THE PROJECT WILL EVALUATE THE FEASIBILITY, EFFECTIVENESS, AND ECONOMICS OF LIMESTONE WET SCRUBBING FOR REMOVAL OF SO2 AND PARTICULATES FROM STACK GAS. TESTS WITH LIME ARE ALSO INCLUDED. AS PART OF THIS PROGRAM, ADDITIONAL TASK EFFORTS WILL INCLUDE (1) SLUDGE TREATMENT/DISPOSAL STUDIES, (2) ADVANCED LIMESTONE TESTING, (3) FLUE GAS CHARACTERIZATION TESTING, (4) DESIGN/COST COMPUTER STUDY, AND (5) A GYPSUM-SLUDGE UTILIZA

****PROJECT: 01586-ADVANCED CONCEPTS SO2 REMOVAL PROCESS IMPROVEMENTS - BENCH-SCALE STUDIES**

STARTING/ COMPLETION DATE : 07/74 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 150000
 TASK CODE=F624A-106 **EPA-D6-E721-BM ** (IAG) PRIOR FY76 / \$ 398000

EPA OFFICER.: RH BORGWARDT EPA/IERL - RTP
 INVESTIGATOR.: JM POTTS US TVA
 JE JORDAN US TVA

MILESTONES.... 02/76 -COMPLETE LAB STUDIES OF DECOMPOSITION OF POTASSIUM PYROSULFITE
 04/76 -COMPLETE LAB STUDIES OF REDUCTION OF POTASSIUM SULFATE
 06/76 -COMPLETE LAB STUDIES OF SO2 ABSORPTION STEP
 08/76 -COMPLETE BENCH-SCALE DECOMPOSITION AND REDUCTION STUDIES
 06/76 -COMPLETE LAB STUDIES OF MOST EFFECTIVE GAS-LIQUOR CONTACT
 08/76 -COMPLETE LAB STUDIES TO UTILIZE DEVICE IN OXIDATION OF CASO3 AND
 10/76 -COMPLETE LAB STUDIES OF SELECTIVE SULFATE PRECIPITATION WITH BARI UM
 03/77 -COMPLETE BENCH-SCALE OXIDATION STUDIES
 09/77 -COMPLETE LAB STUDIES OF FREEZE-CONCENTRATION OF DILUTE PHOSPHATE
 12/77 -COMPLETE LAB STUDIES OF EXTRACTION OF PHOSPHATE ROCK WITH DILUTE SUL

PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES.: RECN-001586 SSIE-GMA 2987 1 EPA -D6-E721-BM TASK-F624A-106
 AP -624A DU -L110 LABT-EMI

ABSTRACT..... THE PURPOSE OF TASK I IS TO DEVELOP AND IMPROVE A POTASSIUM SCRUBBING SYSTEM FOR REMOVING SO2 FROM STACK GASES, ABSORPTION OF SO2, DECOMPOSITION OF RESULTANT POTASSIUM PYROSULFITE BY PYROLYSIS, AND REDUCTION OF PYROLYSIS PRODUCT TO ENABLE PRODUCTION OF ELEMENTAL SULFUR. LABORATORY AND BENCH-SCALE WORK ON THE THREE STEPS HAVE BEEN COMPLETED. THE PURPOSE OF TASK II IS TO DEVELOP BETTER METHODS AND EQUIPMENT FOR PROMOTING OXIDATION IN SO2 RECOVERY SYSTEMS WHERE THIS WOULD BE DESIRABLE AND FOR COPING WITH INADVERTENT OXIDATION IN SYSTEMS WHERE OXIDATION IS UNDESIRABLE. EXPLORATORY TESTS WERE MADE TO STUDY THE SELECTIVE PRECIPITATION OF SULFATE FROM POTASSIUM AND AMMONIUM SULFATE-SULFITE SOLUTIONS BY ADDITION OF BARIUM CARBONATE. A GAS-LIQUOR CONTACT DEVICE WAS DESIGNED AND BUILT WHICH HAS PROVEN SUPERIOR TO A JAPANESE-DEVELOPED SPINNING CUP OXIDIZER, WITH RESPECT TO OXYGEN AND ENERGY UTILIZATION, FOR OXIDATION OF AMMONIUM, POTASSIUM, CALCIUM, AND ZINC SULFITES. THE PURPOSE OF TASK III IS TO STUDY RECOVERY OF SO2 AS DILUTE SULFURIC ACID AND UTILIZATION IN FERTILIZER PROCESSES. EXPLORATORY LABORATORY TESTS HAVE BEEN CONDUCTED ON FREEZE CRYSTALLIZATION OF ICE FROM DILUTE PHOSPHORIC ACID AND AMMONIUM PHOSPHATE SYSTEMS AS A MEANS OF CONCENTRATING THE PHOSPHATE. STUDIES ON EXTRACTION OF PHOSPHATE ROCK WITH DILUTE SULFURIC ACID TO PRODUCE DILUTE PHOSPHORIC ACID WERE ALSO MADE AND EXPLORATORY LABORATORY AND BENCH-SCALE TESTS WERE MADE OF REGENERABLE PROCESSES USING MELAMINE SLURRY AS THE SCRUBBING MEDIUM OR AS AN INTERMEDIATE IN THE REGENERATION STEP.

****PROJECT: 01587-UTILITY BOILER DESIGN/COST COMPARISON - FLUIDIZED-BED COMBUSTION VERSUS
FLUE GAS DESULFURIZATION**

STARTING/ COMPLETION DATE : 06/75 - 02/78 : FUNDING : ESTIMATED - FY77 / \$ 3000
TASK CODE=F624A-108 **EPA=D7-E721-FU ** (IAG) PRIOR FY /

EPA OFFICER.: D MOBLEY EPA/IERL - RTP
INVESTIGATOR.: JT REESE US TVA
JT REESE US TVA

MILESTONES...: 02/78 -PUBLISHED REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION

ORDIS CODES...: RECN-001587 SSIE-GMA 4696 EPA -D7-E721-FU TASK-F624A-108

AP -624A DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO COMPARE THE COMMERCIALY PROJECTED COSTS OF BOTH ATMOSPHERIC (AFB) AND PRESSURIZED (PFB) FLUIDIZED-BED POWER PLANTS TO THE COSTS OF A CONVENTIONAL COAL-FIRED STEAM POWER PLANT UTILIZING FLUE GAS DESULFURIZATION. THE APPROACH INCLUDES: (1) ESTABLISHMENT OF DESIGN BASIS FOR COMPARISON OF EACH POWER PLANT; (2) DEVELOPMENT OF CONCEPTUAL DESIGN AND COST ESTIMATES FOR EACH POWER PLANT; (3) COMPARISON OF TOTAL COSTS FOR EACH PLANT CONCEPT. NASA-ECAS RESULTS WILL PROVIDE CONCEPTUAL DESIGN AND COST ESTIMATES FOR THE FLUID-BED CASES. PROGRESS INCLUDES: (1) MODIFICATION OF ECAS AFB AND PFB DESIGN INFORMATION TO ENABLE DIRECT COMPARISON TO THE CONVENTIONAL PLANT DESIGN INFORMATION PROVIDED BY NASA; (2) CONSOLIDATION OF DESIGN REVIEWS PREPARED BY VARIOUS TVA DIVISIONS INTO A SINGLE TVA UTILITY REVIEW; (3) PRESENTATION OF CAPITAL AND OPERATING COSTS ASSOCIATED WITH EACH OF THE THREE POWER PLANT TYPES. CURRENT PLANS INCLUDE: PUBLISHING OF REPORT BY FEBRUARY OF 1978.

Nitrogen Oxide Control

****PROJECT: 01474-REDUCTION OF POLLUTANT FORMATION IN COAL PARTICLE AND LIQUID FUEL SPRAY FLAMES**

STARTING/ COMPLETION DATE : 10/77 - 10/80 : FUNDING : ESTIMATED - FY77 / \$ 200789
 TASK CODE=F624A-003 **EPA-R805552-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: GB MARTIN EPA/IERL - RTP GRADUATE SCH
 INVESTIGATOR.: UNKNOWN MASSACHUSETTS INST OF TECH
 MILESTONES...: 10/77 -INITIATE GRANT
 10/78 -IDENTIFY COAL AND OIL PYROLYSIS MECHANISMS
 10/80 -COMPLETE DOCUMENTATION
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION TASK-F624A-003
 ORDIS CODES...: RECN-001474 SSIE-GMA 4632 EPA -R805552-01
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: THE OVERALL OBJECTIVE IS TO STUDY THE COMBUSTION OF SOLID AND LIQUID FUELS WITH PARTICULAR EMPHASIS ON NOX, PARTICULATE AND HETEROCYCLIC HYDROCARBON EMISSION. THE FACTORS IN PRACTICAL COMBUSTION SYSTEMS THAT INFLUENCE THE FORMATION AND EMISSION OF THESE POLLUTANTS ARE THE TIME-TEMPERATURE-CONCENTRATION HISTORY OF THE FUEL AND THE CHEMICAL COMPOSITION OF THE ENVIRONMENT. THE APPROACH IS TO SELECT CONDITIONS REPRESENTATIVE OF THOSE IN INDUSTRIAL FLAMES AND FOLLOW THE TIME RESOLVED BEHAVIOR OF THE FUEL INCLUDING THE EVOLUTION OF NITROGEN BEARING COMPOUNDS, THEIR PYROLYSIS AND OXIDATION REACTIONS AND THE EMISSIONS OF CARBONACEOUS SOLIDS AND OTHER POLLUTANTS. THE PROPOSED RESEARCH INVOLVES THE FOLLOWING PARALLEL AND SEQUENTIAL INVESTIGATIONS: A) EXPERIMENTS WITH PULVERIZED COAL PARTICLES AND MONOSIZE DROPLET STREAMS IN HIGH-TEMPERATURE LAMINAR FLOW FURNACES TO DETERMINE THE TIME RESOLVED EVOLUTION AND CHEMICAL TRANSFORMATION OF FUEL-N COMPOUNDS. B) MONOSIZE DROPLET STREAM PYROLYSIS AND COMBUSTION STUDIES IN WHICH OPTICAL DIAGNOSTICS WILL BE USED TO DETERMINE THE TEMPERATURE DISTRIBUTION AROUND THE REACTING DROPLETS IN A QUARTZ TUBE REACTOR. C) SPRAY PYROLYSIS STUDIES SIMULATING CONDITIONS IN THE FIRST STAGE OF STAGED COMBUSTION SYSTEMS IN WHICH THE FUEL-N EVOLUTION, THE REACTIONS OF NITROGENOUS COMPOUNDS AND THOSE LEADING TO THE FORMATION OF CARBONACEOUS SOLIDS WILL BE STUDIED IN FUEL RICH ENVIRONMENTS. IT IS EXPECTED THAT RESULTS OF THESE BASIC STUDIES WILL ASSIST IN THE INTERPRETATION OF RESULTS OBTAINED IN PARAMETRIC INVESTIGATIONS AND THUS LEAD TO THE DEVELOPMENT OF CONTROL METHODS CAPABLE OF REDUCING NOX EMISSION FROM COAL AND HEAVY FUEL OIL FLAMES WITHOUT AN INCREASE IN THE EMISSION OF SOOT AND CARBONACEOUS PARTICULATES.

****PROJECT: 01475-FUEL DECOMPOSITION AND FLAME REACTIONS IN CONVERSION OF FUEL NITROGEN TO NOX**

STARTING/ COMPLETION DATE : 06/75 - 02/78 : FUNDING : ESTIMATED - FY77 / \$ 99967
 TASK CODE=F624A-004 **EPA-68-02-1886 ** (CNTR.) PRIOR FY76 / \$ 230639
 EPA OFFICER.: GB MARTIN EPA/IERL - RTP ADVANCED PROGRAMS
 INVESTIGATOR.: AE AXWORTHY ROCKWELL INTERNATL CORP ADVANCED PROGRAMS
 WH NURICK ROCKWELL INTERNATL CORP
 MILESTONES...: 06/75 -INITIATE CONTRACT
 02/78 -IDENTIFY PRIMARY AND SECONDARY FUEL PYROLYSIS PRODUCTS
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION TASK-F624A-004
 ORDIS CODES...: RECN-001475 SSIE-GMA 4177 EPA -68-02-1886
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: A EIGHTEEN-MONTH EXPERIMENTAL AND ANALYTICAL PROGRAM HAS BEEN INITIATED TO PROVIDE INFORMATION ON FUEL DECOMPOSITION, FUEL OXIDATION AND FLAME REACTIONS WHICH IS REQUIRED FOR THE DEVELOPMENT OF A COMPLETE UNDERSTANDING OF THE CHEMICAL PHENOMENA INVOLVED IN THE CONVERSION OF ORGANIC FUEL NITROGEN COMPOUNDS TO NOX DURING COMBUSTION. THE PROGRAM IS DIVIDED INTO THREE TASKS. TASK I CONSISTS OF ADDITIONAL EXPERIMENTAL STUDIES OF THE TYPES OF CHEMICAL REACTIONS THAT FUEL NITROGEN SPECIES CAN UNDERGO AS FUEL REACTS IN THE EARLY (PREFLAME) STAGES OF COMBUSTION. THE PYROLYSIS AND OXIDATION OF MODEL NITROGEN COMPOUNDS, COALS, RESIDUAL OIL AND ALTERNATE FUELS WILL BE INVESTIGATED. TASK II INVOLVES THE STUDY OF COMBUSTION KINETICS INVOLVED IN FUEL NOX FORMATION FROM HCN AND NH3 IN PREMIXED CH4 FLAMES INCLUDING: 1) INTERACTIONS WITH THERMAL NOX FORMATION; 2) MORE DETAILED ANALYSIS OF NITROGEN-CONTAINING SPECIES, AND 3) ORGANIC NITROGEN ADDITIVES OR DIFFUSION FLAME STUDIES. TASK III WILL INVOLVE SUMMARIZING THE DATA ANALYSIS AND SYNTHESIZING THE RESULTS INTO A QUANTITATIVE SCHEME FOR THE CONVERSION OF FU

****PROJECT: 01478-ENVIRONMENTAL ASSESSMENT OF STATIONARY SOURCE NOX CONTROL TECHNOLOGIES**

STARTING/ COMPLETION DATE : 06/76 - 06/79 : FUNDING : ESTIMATED - FY77 / \$ 600000
 TASK CODE=F624A-006 **EPA-68-02-2160 ** (CNTR.) PRIOR FY76 / \$ 1100240
 EPA OFFICER.: JS BOWEN EPA/IERL - RTP
 INVESTIGATOR.: HB MASON ACUREX CORP
 L WATERLAND ACUREX CORP AEROTHERM DIV
 AEROTHERM DIV

MILESTONES....: 06/76 -INITIATE PROJECT
 02/77 -PRELIMINARY ENVIRONMENT ASSESSMENT REPORT
 07/77 -ALTERNATE CLEAN FUELS SPECIAL REPORT
 01/78 -UTILITY BOILER NOX CONTROL TECHNOLOGY SPECIAL REPORT
 05/78 -INDUSTRIAL BOILER NOX CONTROL TECHNOLOGY SPECIAL REPORT
 05/78 -ADVANCED COMBUSTION CONTROL TECHNOLOGY SPECIAL REPORT
 08/78 -GAS TURBINE NOX CONTROL TECHNOLOGY SPECIAL REPORT
 10/78 -RESIDENTIAL HEATING NOX CONTROL TECHNOLOGY SPECIAL REPORT
 12/78 -IC ENGINE NOX CONTROL TECHNOLOGY SPECIAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001478 SSIE-GMA 3357 1 EPA -68-02-2160 TASK-F624A-006
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVES OF THIS 3-YEAR SYSTEMS STUDY ARE TO (1) IDENTIFY THE MULTI-MEDIA ENVIRONMENTAL IMPACT OF STATIONARY COMBUSTION SOURCES AND NOX COMBUSTION MODIFICATION CONTROLS AND (2) IDENTIFY THE MOST COST EFFECTIVE COMBUSTION MODIFICATION APPROACH(ES) TO ACHIEVING AND MAINTAINING AIR QUALITY FOR NO2. THE RESULTS OF THIS STUDY WILL GUIDE THE DEVELOPMENT AND SUBSEQUENT IMPLEMENTATION OF ENVIRONMENTALLY SOUND NOX CONTROL TECHNIQUES. DETAILED PROCESS ENGINEERING AND MULTIMEDIA IMPACT STUDIES WILL BE MADE OF THE APPLICATION OF COMMERCIAL HEATING SYSTEMS, STATIONARY ENGINES AND INDUSTRIAL PROCESS FURNACES AS WELL AS OF ALTERNATE CONCEPTS SUCH AS THE USE OF CATALYTIC COMBUSTION OR OF CLEAN FUELS. CONTROL OF NOX EMISSIONS BY COMBUSTION PROCESS MODIFICATION WILL BE EMPHASIZED FOR NEAR-TERM APPLICATION. THE COMBINATION OF COMBUSTION MODIFICATION WITH POST-COMBUSTION FLUE GAS TREATMENT WILL BE CONSIDERED FOR APPLICATION IN THE POST-1980 PERIOD. THE INITIAL EFFORT, IN PROGRESS, IS TO GENERATE A COMPREHENSIVE INVENTORY AND PROJECTION OF GASEOUS, LIQUID AND SOLID EFFLUENTS FOR BOTH CONTROLLED AND UNCONTROLLED SOURCES. THE ENVIRONMENTAL STRESSES OF THE SOURCES AND CONTROL SYSTEMS WILL BE EVALUATED ACCORDING TO POLLUTANT TRANSPORT AND TRANSFORMATION AND ULTIMATE RECEPTOR IMPACT. FIELD EMISSION TESTS WILL BE MADE TO AUGMENT THE EXISTING DATA BASE. PROCESS STUDIES WILL YIELD DATA ON CONTROL EFFECTIVENESS, ENERGY EFFICIENCY, COST AND DIFFERENTIAL TRACE EMISSIONS FOR CURRENT AND EMERGING CONTROL SYSTEMS. THE STUDY WILL CULMINATE WITH A SYSTEM ANALYSIS WHICH WILL INTEGRATE THE PROCESS ENGINEERING AND ENVIRONMENTAL IMPACT RESULTS TO DETERMINE THE OPTIMUM COMBINATION OF THE CONTROL SYSTEMS UNDER CONSIDERATION, ON A REGIONAL BASIS, TO COMPLY WITH NO2 AIR QUALITY STANDARDS.

****PROJECT: 01487-COMBUSTOR DESIGN CONCEPTS FOR NOX CONTROL - ADVANCED LBG FIRED SYSTEMS**

STARTING/ COMPLETION DATE : 10/76 - 02/79 : FUNDING : ESTIMATED - FY77 / \$ 280270
 TASK CODE=F624A-014 **EPA-68-02-2196 ** (CNTR.) PRIOR FY76 / \$ 200000
 EPA OFFICER.: GB MARTIN EPA/IERL - RTP
 INVESTIGATOR.: TJ TYSON ULTRASYSTEMS INC
 MP HEAP ULTRASYSTEMS INC
 BA FOLSON ULTRASYSTEMS INC

MILESTONES....: 10/76 -INITIATE CONTRACT
 06/78 -IDENTIFY PROMISING CONCEPTS
 02/79 -COMPLETE PROTOTYPE COMBUSTOR LAB TESTS

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001487 SSIE-GMA 3372 1 EPA -68-02-2196 TASK-F624A-014
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: UTILIZATION OF LOW BTU GAS (LBG) IN AN ENVIRONMENTALLY ACCEPTABLE AND ENERGY EFFICIENT MANNER REQUIRES CAREFUL ATTENTION TO OVERALL SYSTEM DESIGN. WHILE MOST SYSTEM ASPECTS ARE BEING EXTENSIVELY CONSIDERED, THE COMBUSTOR FOR UTILIZATION OF HIGH TEMPERATURE, NITROGEN COMPOUND CONTAINING LRG WITHOUT PRODUCTION OF HIGH LEVELS OF NOX AND OTHER POLLUTANTS HAS NOT BEEN GIVEN SUFFICIENT ATTENTION. PRELIMINARY CALCULATIONS PERFORMED ON EPA CONTRACT 68-02-1361 INDICATED SIGNIFICANT PROMISE FOR CONTROL OF THERMAL AND FUEL NOX BY PROPER COMBUSTION DESIGN THIS PROGRAM WILL SUBSTANTIATE THOSE CONCEPTS THROUGH A COORDINATED STUDY INCLUDING: 1) COMBUSTOR DESIGN CALCULATIONS; 2) BENCH SCALE EXPERIMENTS; AND 3) DESIGN AND FABRICATION OF TWO PROTOTYPE COMBUSTORS FOR TESTING AT THE IERL-RTP LABORATORY.

****PROJECT: 01490-INVESTIGATION OF NOX NITRATE AND SULFATE PRODUCTION IN LABORATORY FLAMES**

STARTING/ COMPLETION DATE : 10/76 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 150000
 TASK CODE=F624A-017 **EPA-68-02-2188 ** (CNTR.) PRIOR FY76 / \$ 90000

EPA OFFICER.: WA LANIER
 INVESTIGATOR.: DJ SEERY
 MF ZABIELSKI
 LG DODGE

EPA/IERL - RTP
 UNITED TECHNOLOGIES CORP
 UNITED TECHNOLOGIES CORP
 UNITED TECHNOLOGIES CORP

MILESTONES...: 09/76 -INITIATE CONTRACT
 10/77 -COMPLETE ASSESSMENT OF CLEAN FUEL KINETICS INCLUDING NO2 FORMATIO
 09/78 -COMPLETE STUDY OF PROBE EFFECTS, SULFATE FORMATION, AND NOX/SOx I
 11/78 -COMPLETE FINAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: REC-N-001490 SSIE-GMA 3322 1 EPA -68-02-2188 TASK-F624A-017
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: AN EXPERIMENTAL PROGRAM WILL BE CONDUCTED TO MEASURE THE CONCENTRATIONS OF THE IMPORTANT STABLE AND UNSTABLE SPECIES IN METHANE-AIR FLAMES. PARTICULAR EMPHASIS WILL BE PLACED ON A DETERMINATION OF THE PRESENCE OF NITRATES AND SULFATES IN THE FLAME ZONE. IN ADDITION TO SEARCHING FOR FLAME FORMED NITRATES, THE STUDY WILL DEVOTE A MAJOR EFFORT TO DETERMINING IF THE NITRATE PRESURSOR, NO2, IS ACTUALLY PRESENT IN THE EARLY FLAME ZONE AND IF REACTIONS ARE OCCURRING WITHIN THE SAMPLING PROBE WHICH PERTURB THE ACTUAL NO/NO2 CONCENTRATION RATIO. VARIOUS SAMPLING TECHNIQUES WILL BE EMPLOYED INCLUDING COOLED AND UNCOOLED QUARTZ MICROPROBES, OPTICAL SPECTROSCOPY, AND MOLECULAR BEAM SAMPLING FOR MEASUREMENTS OF RADICAL SPECIES AND STABLE SPECIES WITH INTERFERENCES. THE MOLECULAR BEAM SAMPLING-MASS SPECTROMETRY TECHNIQUE WILL BE AUGMENTED BY USE OF THE APPEARANCE POTENTIAL MEASUREMENTS WHICH GREATLY INCREASES THE NUMBER OF SPECIES WHICH CAN BE MEASURED. MEASUREMENTS WILL BE MADE OVER A RANGE OF STOICHIOMETRIES AND WITH THE NOX RESULTING FROM CONVERSION OF BOTH ATMOSPHERIC N2 AND FUEL-BOUND NITROGEN. ONE EXPERIMENTAL SERIES CALLS FOR DOPING THE FUEL WITH HYDROGEN SULFIDE AND SAMPLING TO IDENTIFY THE PRESENCE OF FLAME FORMED SULFATES. THIS SERIES OF TESTS WILL BE PERFORMED USING THE MOLECULAR BEAM SAMPLER SO THAT NOT ONLY SULFATES BUT ALSO THEIR PRECURSORS WILL BE IDENTIFIED.

****PROJECT: 01492-ADVANCED COMBUSTION SYSTEMS FOR STATIONARY GAS TURBINE ENGINES**

STARTING/ COMPLETION DATE : 12/75 - 04/78 : FUNDING : ESTIMATED - FY77 / \$ 256700
 TASK CODE=F624A-018 **EPA-68-02-2136 ** (CNTR.) PRIOR FY76 / \$ 900000

EPA OFFICER.: WS LANIER
 INVESTIGATOR.: SA MOSIER
 RM PIERCE

EPA/IERL - RTP
 UNITED TECHNOLOGIES CORP
 UNITED TECHNOLOGIES CORP

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MILESTONES...: 12/75 -INITIATE CONTRACT
 05/76 -COMPLETE DUTY CYCLE REVIEW AND COMBUSTOR CONCEPT SELECTION
 10/77 -COMPLETE BENCH SCALE EVALUATION OF COMBUSTOR CONCEPTS
 12/77 -BENCH SCALE TESTING FINAL REPORT
 01/78 -COMPLETE CONSTRUCTION OF FULL SCALE COMBUSTORS
 08/78 -COMPLETE EVALUATION OF FULL-SCALE HARDWARE
 10/78 -FINAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: REC-N-001492 SSIE-GMA 2747 1 EPA -68-02-2136 TASK-F624A-018
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: AN EXPLORATORY DEVELOPMENT PROGRAM OF ANALYSIS AND EXPERIMENTATION WILL BE CONDUCTED TO IDENTIFY NEW STATIONARY GAS TURBINE COMBUSTION DESIGNS WHICH REDUCE POLLUTANT EMISSIONS. PRIMARY EMPHASIS WILL BE PLACED UPON CONTROL OF THE OXIDES OF NITROGEN (NOX) FROM BOTH THE THERMAL AND FUEL-BOUND SOURCES VIA DRY TECHNIQUES, WHILE AT LEAST MAINTAINING CURRENT CONTROL OF CARBON MONOXIDE (CO) AND UNBURNED HYDROCARBONS (UHC). THE PROGRAM IS DIVIDED INTO FOUR PHASES: (1) A REVIEW OF THE VARIOUS COMBUSTOR DESIGN APPROACHES; (2) SCREENING EXPERIMENTS OF THE VARIOUS TECHNIQUES; (3) DESIGN OF FULL-SCALE COMBUSTORS FOR A NOMINALLY 25 MW STATIONARY GAS TURBINE ENGINE; AND (4) EVALUATION OF THE FULL-SCALE COMBUSTORS IN BOTH TEST RIGS AND IN AN ENGINE. THROUGHOUT THE PERFORMANCE OF ALL FOUR PHASES, THE NOX CONCENTRATION GOALS FOR THE COMBUSTOR DESIGNS ARE 50 PPMV WHEN BURNING GAS OR OIL CONTAINING NO MORE THAN TRACE QUANTITIES OF BOUND NITROGEN AND 100 PPMV WHEN BURNING OIL CONTAINING UP TO 0.5% (BY WEIGHT) OF CHEMICALLY BOUND NITROGEN. THE CO CONCENTRATION GOAL IS 100 PPMV REGARDLESS OF THE FUEL TYPE.

****PROJECT: 01495-STAGED COMBUSTION FOR NOX CONTROL AND ENHANCED SO3 EMISSIONS**

STARTING/ COMPLETION DATE : 07/77 - 01/78 : FUNDING : ESTIMATED - FY77 / \$ 34559
 TASK CODE=F624A-020 **EPA-RB05330-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: A LEVY
 INVESTIGATOR.: A LEVY
 MILESTONES...: 07/77 -INITIATE GRANT
 01/78 -COMPLETE ASSESSMENT OF ENHANCED SULFATE FORMATION FROM STAGE COMB
 02/78 -COMPLETE FINAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: REC-N-001495 SSIE-GMA 4208 EPA -RB05330-01 TASK-F624A-020
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: PREVIOUS EXPERIMENTAL STUDIES INDICATE THAT STAGED COMBUSTION PROCESSES DESIGNED TO REDUCE NOX EMISSIONS MAY ENHANCE SO3 EMISSION. THE OBJECTIVE OF THIS PROPOSED PROGRAM IS TO INVESTIGATE THE EXTENT TO WHICH SO3/SO2 RATIOS MAY BE INCREASED WHEN NOX EMISSIONS IS REDUCED UNDER SPECIFIC AND WELL DEFINED CONDITIONS OF STAGED COMBUSTION. FOR THESE STUDIES, A SIMPLE TWO-STAGE LABORATORY BURNER WILL BE USED. MEASUREMENTS OF NOX, SO2, SO3, AND TEMPERATURE WILL BE AT THE EXIT OF EACH STAGE FOR BOTH SINGLE-STAGE AND TWO-STAGE OPERATION OF THE BURNER UNDER DIFFERENT OPERATING CONDITIONS. RESULTS FROM THESE STUDIES WILL BE USED TO ASSESS THE EXTENT TO WHICH ENHANCED SO3 PRODUCTION CAN BE A PROBLEM IN STAGED COMBUSTION SYSTEMS.

****PROJECT: 01496-ASSESSMENT AND APPLICATION OF COMBUSTION ADDITIVE PROCESS FOR NOX CONTROL**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 9852
 TASK CODE=F624A-021 **EPA-68-02-2649 ** (CNTR.) PRIOR FY75 / \$ 61948
 EPA OFFICER.: DG LACHAPELLE EPA/IERL - RTP
 INVESTIGATOR.: W BARTOK EXXON RESEARCH & ENGINEERING CO
 R LYON EXXON RESEARCH & ENGINEERING CO
 PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES.: REC-001496 SSIE-GMA 4623 EPA -68-02-2649 TASK-F624A-021
 AP -624A DU -L110 LABT-EMI
 ABSTRACT..... OBJECTIVE: EVALUATE PROPRIETARY NH3 INJECTION TECHNOLOGY DEVELOPED BY EXXON RESEARCH & ENGINEERING CO. THE TECHNOLOGY PROVIDES FOR POST-FLAME, NON-CATALYTIC REDUCTION OF NOX TO N2 BY INJECTION OF GASEOUS NH3. THE PROCESS HAS BEEN PROVEN IN JAPAN WITH OIL-FIRED BOILERS. IT HAS NOT BEEN DEMONSTRATED ON COAL-FIRED BOILERS. APPROACH: THE FEASIBILITY OF THE PROCESS WILL BE REVIEWED THROUGH DISCLOSURE BY EXXON OF PROPRIETARY REPORTS MADE AVAILABLE TO EPA PERSONNEL AND AN INDEPENDENT, IMPARTIAL THIRD PARTY. PILOT SCALE WORK ON A COAL-FIRED PILOT-SCALE BOILER WILL BE PROVIDED BY EXXON. PERFORMANCE DATA AND IMPLEMENTATION COSTS WILL BE DEVELOPED. PROGRESS: A CONTRACT HAS BEEN IN NEGOTIATION FOR ABOUT 2 YEARS. PROBLEMS OVER DATA RIGHTS ARE BEING RESOLVED.

****PROJECT: 01502-EFFECTS OF FUEL PROPERTIES AND ATOMIZATION PARAMETERS ON NOX CONTROL FOR HEAVY LIQUID FUEL-FIRED PACKAGE BOILERS**

STARTING/ COMPLETION DATE : 01/77 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 204301
 TASK CODE=F624A-026 **EPA-68-02-2624 ** (CNTR.) PRIOR FY76 / \$ 135317
 EPA OFFICER.: GB MARTIN EPA/IERL - RTP
 INVESTIGATOR.: MP HEAP ULTRASYSTEMS INC
 JE CICHANOWICZ ULTRASYSTEMS INC
 ML LOBELL ULTRASYSTEMS INC
 MILESTONES.... 01/77 -INITIATE CONTRACT
 03/78 -DEFINE PRELIMINARY CRITERIA FOR ATOMIZATION
 PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES.: REC-001502 SSIE-GMA 4203 EPA -68-02-2624 TASK-F624A-026
 AP -624A DU -L110 LABT-EMI
 ABSTRACT..... COMBUSTION AIR STAGING HAS BEEN DEMONSTRATED TO BE A VIABLE TECHNIQUE FOR THE CONTROL OF NOX EMISSIONS FROM RESIDUAL OIL-FIRED PACKAGE BOILERS. HOWEVER, THE REDUCTION IN OXIDES OF NITROGEN CAN BE ACCOMPANIED BY AN INCREASE IN CARBONACEOUS PARTICULATE MATTER WHICH EVENTUALLY LIMITS THE AMOUNT OF STAGING AND THUS THE CONTROL OF NOX. THE FORMATION OF BOTH POLLUTANTS IS STRONGLY LINKED TO THE FUEL/AIR MIXING PROCESS AND THE PROPERTIES OF THE FUEL. THE OVERALL OBJECTIVE OF THIS PROGRAM IS TO DEFINE THE EFFECT OF FUEL ATOMIZATION TECHNIQUES AND OF FUEL PROPERTIES ON POLLUTANT EMISSIONS. COMMERCIALY AVAILABLE FUEL ATOMIZERS WILL BE SURVEYED AND THEIR CHARACTERISTIC FEATURES DEFINED. THE INFLUENCE OF VARIOUS CRUDE OIL PROPERTIES AND THE PETROLEUM REFINING PROCESS ON THE CHARACTERISTICS OF RESIDUAL FUEL OILS WILL BE EXPLORED. THE BULK OF THE PROGRAM INVOLVES A SERIES OF EXPERIMENTS WITH A PACKAGE BOILER SIMULATOR TO DEFINE THE INFLUENCE OF VARIOUS ATOMIZERS AND FUEL CHARACTERISTICS ON POLLUTANT FORMATION. TWO ADDITIONAL EXPERIMENTS ARE PLANNED TO AID IN THE INTERPRETATION OF THE EXPERIMENTAL RESULTS GENERATED BY THE PACKAGE BOILER SIMULATOR. THESE INVOLVE TWO SPECIALLY BUILT EXPERIMENTAL SYSTEMS TO DEFINE THE CONVERSION OF FUEL-BOUND NITROGEN TO OXIDES OF NITROGEN AND TO CHARACTERIZE THE DETAILS OF THE FUEL SPRAY UNDER REALISTIC CONDITIONS.

****PROJECT: 01808-EMISSIONS CONTROL TECHNOLOGY FOR HIGH PRESSURE COMBUSTION SYSTEMS**

STARTING/ COMPLETION DATE : 07/75 - 09/81 : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=F624A-029 **EPA- ** (IN-HO) PRIOR FY76 / \$ 90000
 IN-HOUSE EFFORT : FY 77 / 00.4 YEARS : TOTAL PROJECT 02.0
 EPA OFFICER.: JH WASSER EPA/IERL - RTP
 INVESTIGATOR.: JH WASSER US EPA
 MILESTONES.... 09/75 -COMPLETED NOX CONTROL EVALUATION OF WATER INJECTION ON GT ENGINE ORD/IERL
 08/77 -COMPLETED NOX CONTROL EVALUATION OF WATER INJECTION ON DIESEL ENG
 06/78 -COMPLETE ASSESSMENT OF CATALYTIC REACTOR ON DIESEL ENGINE
 06/79 -COMPLETE PARTICULATE ASSESSMENT ON GT ENGINE AND DIESEL ENGINE
 07/80 -COMPLETE HIGH PRESSURE COMBUSTION STUDY ON FLUID BED MODEL
 09/81 -COMPLETE HIGH PRESSURE COMBUSTOR STUDY
 PLAN ID..... (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES.: REC-001808 SSIE-ZMA 1136 TASK-F624A-029 AP -624A
 DU -L110 LABT-EMI
 ABSTRACT..... THIS PROJECT WILL INVESTIGATE, IN AN EXPERIMENTAL SYSTEM, THE EMISSIONS FROM COMBUSTION OF LIQUID AND GASEOUS FUELS AT PRESSURES BETWEEN 1 AND 8.5 ATMOSPHERES. COMPREHENSIVE ANALYSIS FOR POLLUTANTS IN ADDITION TO THE CRITERIA POLLUTANTS WILL BE CARRIED OUT OVER A RANGE OF OPERATING CONDITIONS. CAPABILITY FOR INVESTIGATING SEVERAL COMBUSTION SYSTEM CATEGORIES WILL BE DEVELOPED. OTHER AREAS OF WORK WILL INVOLVE TESTING AND MODIFICATION EVALUATION FOR CONTROL TECHNOLOGY ON ACTUAL GAS TURBINE AND DIESEL ENGINES. WATER/FUEL OIL EMULSIONS AND CATALYTIC EXHAUST DEVICES ARE CURRENTLY UNDER STUDY.

Flue Gas Particulate Control

****PROJECT: 01484-EVALUATION OF EMISSIONS AND CONTROL TECHNOLOGY FOR INDUSTRIAL STOKER BOILERS**

STARTING/ COMPLETION DATE : 03/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 250000
 TASK CODE=F624A-010 **EPA=68-02-2627 ** (CNTR.) PRIOR FY76 / \$ 75000

EPA OFFICER.: JH WASSER EPA/IERL - RTP
 INVESTIGATOR.: RD GIANMAR BATTELLE MEMORIAL INST
 RE BARRETT BATTELLE MEMORIAL INST
 A LEVY BATTELLE MEMORIAL INST
 FM TIMM BATTELLE MEMORIAL INST

MILESTONES...: 12/77 -MODEL SPREADER STOKER COMPLETED
 06/78 -RESEARCH PROGRAM ON CLEANED COALS COMPLETED
 10/79 -DEVELOPMENT PROGRAM ON FULL SCALE SPREADER STOKER COMPLETED

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001484 SSIE-GMA 4205 EPA -68-02-2627 TASK-F624A-010
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: BATTELLE-COLUMBUS IS CONDUCTING A PROGRAM TO (1) CHARACTERIZE THE SPECTRUM OF EMISSIONS FROM INDUSTRIAL COAL-FIRED STOKER BOILERS FIRING SEVERAL TYPES OF COAL UNDER VARIOUS STOKER FIRING CONDITIONS, (2) INVESTIGATE CONTROL METHODS TO REDUCE THESE EMISSIONS, (3) DETERMINE THE EFFECT OF THESE CONTROL METHODS AND VARIATIONS IN STOKER BOILER OPERATION ON THE OVERALL PERFORMANCE OF THE STOKER BOILER, AND (4) ASSESS THE ENVIRONMENTAL IMPACT OF NEW TECHNOLOGY ON THE FUTURE ACCEPTABILITY OF STOKER BOILERS. THE PROGRAM IS DIVIDED INTO TWO PHASES. IN PHASE I, THE COMPREHENSIVE EMISSIONS CHARACTERISTICS WILL BE DETERMINED FROM THE COMBUSTION OF UNTREATED, RECONSTITUTED, AND PROCESSED COALS IN BATTELLE'S 20-HP STOKER BOILER SMALL-SCALE STOKER. APPROPRIATE DATA WILL BE COLLECTED TO DETERMINE IF CRITERIA POLLUTANTS AND LEVEL 1 AND LEVEL 2 POLLUTANT GROUPS ARE RESPONSIVE TO CHANGES IN FUEL, STOKER OPERATION, OR COMBUSTION PARAMETERS. AN ASSESSMENT WILL BE DEVELOPED THAT WILL INCLUDE DEFINING THE POTENTIAL FOR UNTREATED, RECONSTITUTED, AND PROCESSED COALS TO IMPROVE THE ENVIRONMENTAL ACCEPTABILITY OF STOKER BOILERS. PHASE II WILL BE CONDUCTED TO IDENTIFY AND EVALUATE POTENTIAL CONTROL CONCEPTS FOR CONTROL OF EMISSIONS FROM FULL-SCALE INDUSTRIAL STOKER BOILERS. THE BATTELLE STEAM PLANT 600-HP SPREADER-STOKER BOILER WILL BE UTILIZED AND MODIFIED TO EVALUATE POTENTIAL CONTROL CONCEPTS. THIS PHASE WILL PROVIDE A SYSTEMATIC EVALUATION OF CONTROL CONCEPTS WHILE FIRING SEVERAL REPRESENTATIVE STOKER FUELS, INCLUDING THE MOST PROMISING TREATED COAL IDENTIFIED IN PHASE I. BASED ON THE RESULTS OF THE RESEARCH PROGRAM, AN ASSESSMENT WILL BE DEVELOPED TO DEFINE THE POTENTIAL OF EMISSIONS CONTROL ON THE OVERALL ACCEPTABILITY OF INDUSTRIAL STOKER COAL-FIRED BOILERS.

****PROJECT: 01485-COMBUSTION RESEARCH ON COAL NITROGEN AND PARTICULATE ORGANIC MATTER**

STARTING/ COMPLETION DATE : 08/74 - 10/77 : FUNDING : ESTIMATED - FY77 / \$ 20000
 TASK CODE=F624A-012 **EPA=R803242 ** (GRANT) PRIOR FY76 / \$ 355000

EPA OFFICER.: JH WASSER EPA/IERL - RTP
 INVESTIGATOR.: AF SAROFIM MIT
 JB HOWARD MIT
 R HITES MIT

MILESTONES...: 08/75 -COMPLETE EXPERIMENTAL SYSTEMS AND INITIAL TEST
 08/76 -COMPLETE STUDY OF SOOT AND PCMH FORMATION IN TURBULANT DIFFUSION
 08/76 -COMPLETE EVALUATION OF COMPOUND N BEHAVIOR FOR TWO COMMON COALS
 10/77 -FINAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001485 SSIE-GMA 4207 EPA -R803242 TASK-F624A-012
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: TASK I. CHARACTERIZATION OF POM FROM DIFFUSION AND PREMIXED FLAMES. THE RESEARCH IS CONCERNED WITH THE QUALITATIVE AND QUANTITATIVE ASSESSMENT OF THE PRODUCTION OF PARTICULATE ORGANIC MATTER IN LABORATORY FLAMES. THE OBJECTIVES ARE TO DETERMINE WITHIN THE FLAME AND IN THE EXHAUST GASES (1) THE SIZE DISTRIBUTION AND CONCENTRATIONS OF SOOT PARTICLES, (2) THE IDENTITIES AND CONCENTRATIONS OF ORGANIC COMPOUNDS, (3) THE RELATIONSHIP BETWEEN SOOT AND ORGANIC COMPOUNDS GENERATED IN THE FLAME. EXPERIMENTAL METHODOLOGY USED INCLUDES PARTICLE CONCENTRATION AND SIZE DISTRIBUTION BY ELECTRON MICROSCOPY, AND ANALYSIS OF POLYCYCLIC AROMATIC HYDROCARBON BY GAS CHROMATOGRAPHIC MASS SPECTROMETRY AND HIGH-RESOLUTION MASS SPECTROMETRY. THE MAJOR EMPHASIS INVOLVES THE APPLICATION OF MOLECULAR BEAM SAMPLER AND ON-LINE MASS SPECTROMETER FOR COMPLETE GAS PHASE ANALYSIS. ADDITIONAL INFORMATION IS OBTAINED BY SAMPLING ATMOSPHERIC PRESSURE TURBULENT DIFFUSION FLAMES AND LAMINAR PREMIXED FLAMES BY WATER-INJECTED SAMPLING PROBES. TASK II. KINETICS OF DEVOLATILIZATION OF NITROGEN COMPOUNDS DURING THE HIGH-TEMPERATURE PYROLYSIS OF COAL. THE PROGRAM OBJECTIVES ARE TO OBTAIN A BETTER UNDERSTANDING OF THE PROCESSES CONTRIBUTING TO THE EMISSION OF NOX FROM COAL-FIRED BOILERS TO BETTER DEFINE CONTROL METHODS. FUEL BOUND NITROGEN COMPLICATES DEVELOPMENT OF LOW NOX BURNERS BECAUSE THE NITROGEN IN CHAR MAY PERSIST INTO THE SECOND STAGE OF A STAGED COMBUSTOR. DURING THE PAST TWO YEARS LABORATORY FURNACES HAVE BEEN DEVELOPED FOR THE PYROLYSIS AND OXIDATION OF PULVERIZED COAL UNDER CONDITIONS SIMULATING UTILITY BOILERS. RESULTS ON NITROGEN RETENTION IN CHAR HAVE BEEN DETERMINED FOR TWO COALS AS A FUNCTION OF TEMPERATURE AND TIME. ALSO, THE CONVERSION OF THE FUEL NITROGEN TO NOX HAS BEEN DETERMINED AS A FUNCTION OF FUEL/AIR RATIO FOR ONE FURNACE TEMPERATURE. FIVE ADDITIONAL COALS WILL BE STUDIED OVER A WIDER RANGE OF TEMPERATURES AND DATA WILL BE OBTAINED ON THE GAS PHASE CONSTITUENTS OF PYROLYSIS. THE COALS CHARS WILL BE CHARACTERIZED TO DEVELOP MECHANISTIC MODELS FOR EXTRAPOLATION OF DATA TO OTHER CONDITIONS.

****PROJECT: 01533-SAMPLING AND ANALYSIS METHODS FOR POM AND OTHER ORGANIC POLLUTANTS**

STARTING/ COMPLETION DATE : 03/76 - 03/79 : FUNDING : ESTIMATED - FY77 / \$ 201000
 TASK CODE=F624A-050 **EPA-68-02-2150 ** (CNTR.) PRIOR FY76 / \$ 490000

EPA OFFICER.: LD JOHNSON EPA/IERL - RTP
 INVESTIGATOR.: P LEVINS ARTHUR D. LITTLE INC

MILESTONES....: 09/76 -SORPTION AGENTS FOR OCEAN INCINERATION REPORT
 06/77 -TECH MANUAL FOR ANALYSIS OF ORGANICS IN FUELS
 06/77 -REPORT ON STABILITY, STORAGE AND HANDLING OF SAMPLES
 09/77 -REPORT ON ANALYSIS OF PCB FROM COMBUSTION SOURCES
 12/77 -REPORT ON RETENTION PROPERTIES OF SPECIFIED ORGANICS ON SORBENTS
 01/79 -EVALUATE ORGANIC ANALYSIS FOR LEVEL 2

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001533 SSIE-GMA 4158 EPA -68-02-2150 TASK-F624A-050
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVE: THE PURPOSE OF THIS CONTRACT IS TO PROVIDE FOR THE EVALUATION, DEVELOPMENT, FIELD TESTING AND APPLICATIONS RESEARCH OF THE ORGANIC SUBSTANCES SAMPLING AND ANALYSIS PROCEDURES NECESSARY TO CONDUCT ENVIRONMENTAL ASSESSMENTS AND TECHNOLOGY DEVELOPMENT PROJECTS IN IERL-RTP. APPROACH: A SERIES OF TECHNICAL DIRECTIVES AIMED AT ACCOMPLISHING THE ABOVE GOALS ARE BEING IMPLEMENTED. OUTPUTS: REPORTS, TECHNICAL MANUALS, AND REVIEW DOCUMENTS. SOME WILL BE OF INTEREST TO IERL ONLY; MANY WILL BE OF GENERAL INTEREST.

****PROJECT: 01534-PARTICULATE SAMPLING AND SUPPORT**

STARTING/ COMPLETION DATE : 11/75 - 11/78 : FUNDING : ESTIMATED - FY77 / \$ 125000
 TASK CODE=F624A-051 **EPA-68-02-2131 ** (CNTR.) PRIOR FY76 / \$ 504888

EPA OFFICER.: B HARRIS EPA/IERL - RTP
 INVESTIGATOR.: WB SMITH SOUTHERN RESEARCH INST
 JD MCCAIN SOUTHERN RESEARCH INST
 KM CUSHING SOUTHERN RESEARCH INST

MILESTONES....: 06/77 -IMPACTOR SUBSTRATE REPORT
 06/77 -CALCULATOR HANDBOOKS FOR FIELD DATA REDUCTION
 06/77 -ESP EVALUATION PROCEDURES MANUAL
 06/77 -DESIGN, BUILD AND EVALUATE SERIES CYCLONE FOR PARTICLE SIZING
 06/77 -NON-IDEAL BEHAVIOR OF IMPACTORS (APCA PAPER)
 09/77 -COMPUTER DATA REDUCTION MANUAL - CASCADE IMPACTORS
 09/77 -PROTOTYPE SAMPLING ESP
 11/77 -BAGHOUSE EVALUATION PROCEDURES MANUAL
 12/77 -TECHNICAL MANUAL ON PARTICULATE SAMPLING

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001534 SSIE-GMA 3010 1 EPA -68-02-2131 TASK-F624A-051
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVE: CONDUCT A CONTINUING PROGRAM OF EVALUATION, DEVELOPMENT, TESTING AND FIELD ADAPTION OF MEASUREMENT TECHNIQUES FOR PARTICULATE MASS AND SIZE IN PROCESS STREAMS. APPROACH: (1) IDENTIFY CURRENT AND FUTURE REQUIREMENTS FOR PARTICULATE SAMPLING--THE NATURE OF THE PARTICLES, THE SAMPLING CONDITIONS, AND THE GOALS OF THE SAMPLING PROGRAM. (2) DESIGN PROTOTYPE IMPACTORS WHICH INCORPORATE ALL THAT HAS BEEN LEARNED ABOUT THEIR FUNDAMENTAL BEHAVIOR AND OPERATIONAL PROBLEMS. (3) EVALUATE CYCLONE SYSTEMS FOR PARTICLE SIZING. CONSIDER ALTERNATIVES TO FILTER BACKUPS ON HIGH FLOWRATE SYSTEMS. (4) STUDY ALTERNATIVES TO IMPACTORS AND CYCLONES FOR PARTICLE SIZING. (5) STUDY AND EVALUATE MASS MONITORS. (6) STUDY METHODS OF QUALITY ASSURANCE IN SAMPLING AND CALIBRATION PROGRAMS. (7) GENERATE AND REVIEW DOCUMENTS ON PARTICULATE SAMPLING AND CONTINUALLY UPDATE THE BIBLIOGRAPHY AND LITERATURE SURVEY. (8) CONTINUE TO STUDY AND EVALUATE NEW IDEAS, TECHNIQUES, AND INSTRUMENTS FOR PARTICULATE SAMPLING. (9) ATTEND AND ORGANIZE MEETINGS AND SYMPOSIA ON PARTICULATE SAMPLING. (10) PROVIDE CONSULTING AND SUPPORT TO EPA PROGRAM.

****PROJECT: 01542-OPERATION OF PILOT SCALE ESP VERSATILE FABRIC FILTER, AND BAGHOUSES (IN-HOUSE)**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 40000
 TASK CODE=F624A-056 **EPA= ** (IN-HO) PRIOR FY76 / \$ 150000
 IN-HOUSE EFFORT : FY 77 / 00.8 YEARS : TOTAL PROJECT 03.0
 EPA OFFICER.: GH RAMSEY EPA/IERL - RTP
 INVESTIGATOR.: JH TURNER US EPA
 LE SPARKS US EPA
 GH RAMSEY US EPA
 MILESTONES....: 06/76 -COMPLETE REPORT OF FILTRATION STUDY OF POLYESTER FILTER BAGS
 12/76 -COMPLETE REPORT OF FILTRATION STUDY OF EXPANDED PTFE BAGS
 04/77 -INSTALL PILOT-SCALE ESP
 08/77 -COMPLETE INSTALLATION OF VERSATILE FABRIC FILTER TEST UNIT
 12/77 -ISSUE REPORT OF INITIAL ESP TESTING
 03/78 -COMPLETE STUDY OF WET-SCRUBBER AT OUTLET OF ESP
 09/78 -COMPLETE STUDY OF RESISTIVITY OF FLY ASH
 06/78 -ISSUE REPORT OF INITIAL TESTING ON VERSATILE FABRIC FILTER UNIT
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001542 SSIE-ZMA 1135 TASK-F624A-056 AP -624A
 DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVE: THE OBJECTIVE OF THE IN-HOUSE PROJECTS IS TO PERFORM VARIOUS TESTS ON THE ESP, THE VERSATILE FABRIC FILTER TEST UNIT, THE SINGLE COMPARTMENT SHAKER BAGHOUSE, AND THE PULSE-JET BAGHOUSES TO IMPROVE PARTICULATE COLLECTABILITY IN FULL-SIZE COLLECTION DEVICES. NEW IDEAS AND NOVEL COLLECTION DEVICES AND MATERIALS WILL BE TESTED ON THE PILOT-SCALE UNITS IN ORDER TO DETERMINE IF THEY DO HAVE A POSSIBILITY FOR IMPROVING THE EFFICIENCY OF THE PRESENT METHODS FOR COLLECTING PARTICULATES. APPROACH: VARIOUS MATERIALS WILL BE TESTED IN THE VERSATILE FABRIC FILTER TEST UNIT IN ORDER TO DETERMINE THE FEASIBILITY OF USING BAGHOUSES AT TEMPERATURES UP TO 1500 DEGREES F. FABRIC MATERIALS WILL BE TESTED ON BOTH THE HIGH-TEMPERATURE VERSATILE UNIT AND THE AMBIENT-TEMPERATURE UNITS. FABRICS WILL BE TESTED FOR BOTH EFFICIENCY AND ENDURANCE. THE ESP WILL BE USED TO TEST VARIOUS DUST RESISTIVITIES AND ALSO TO DETERMINE THE FEASIBILITY OF INSTALLING A WET-SCRUBBER AT THE OUTLET OF THE ESP. THE UNITS ARE VERSATILE ENOUGH TO TEST AT MANY CONDITIONS WHICH COVER THE RANGE OF MOST COMMERCIAL UNITS. OUTPUTS: CURRENT ACTIVITY IS BEING DEVOTED TO SHAKEDOWN TESTING OF THE ESP AND THE VERSATILE FABRIC FILTER TEST UNIT WITH A REPORT TO BE ISSUED FOR EACH AREA OF STUDY.

****PROJECT: 01543-FABRIC FILTRATION RESEARCH - EPA IN-HOUSE**

STARTING/ COMPLETION DATE : 06/73 - UNK : FUNDING : ESTIMATED - FY77 / \$ 60000
 TASK CODE=F624A-057 **EPA= ** (IN-HO) PRIOR FY /
 IN-HOUSE EFFORT : FY 77 / 02.0 YEARS : TOTAL PROJECT
 EPA OFFICER.: JH TURNER EPA/IERL - RTP
 INVESTIGATOR.: JH TURNER US EPA/ORD IERL/UTIL INDUS POWR DIV
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001543 SSIE-ZMA 1341 TASK-F624A-057 AP -624A
 DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES: ONGOING RESEARCH IN FABRIC FILTRATION TO INVESTIGATE FINE PARTICLE CAPTURE AND PENETRATION MECHANISMS, CLEANING EFFECTS, AND ADVANCED FABRICS. APPROACH: COLLECT DATA BY MEANS OF WELL INSTRUMENTED AND CONTROLLED SINGLE COMPARTMENT BAGHOUSES. CURRENT PLANS AND/OR PROGRESS: PREVIOUS WORK HAS BEEN PUBLISHED; CURRENT AND FUTURE WORK WILL BE PUBLISHED AS EPA REPORTS. HIGH-TEMPERATURE FILTRATION AND FILTRATION IN HARSH ENVIRONMENTS WILL BE STUDIED.

****PROJECT: 01544-BAGHOUSE STUDY AS AN EMISSION CONTROL ON A SOLID WASTE INCINERATOR BOILER**

STARTING/ COMPLETION DATE : 05/76 - 08/78 : FUNDING : ESTIMATED - FY77 / \$ 67079
 TASK CODE=F624A-058 **EPA=R804233 ** (GRANT) PRIOR FY76 / \$ 65000
 EPA OFFICER.: JH TURNER EPA/IERL - RTP
 INVESTIGATOR.: B MCDERMOTT NASHVILLE THERMAL TRANSFER CO
 MILESTONES....: 05/76 -GRANT AWARD
 09/77 -REPORT ON PRELIMINARY PERFORMANCE RESULTS
 09/78 -FINAL REPORT
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001544 SSIE-GMA 4134 EPA -R804233 TASK-F624A-058
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: DETERMINE APPLICABILITY AND PERFORMANCE FOR PILOT BAGHOUSE ON WASTE TO ENERGY MUNICIPAL INCINERATOR. OPERATE PILOT BAGHOUSES ON INCINERATOR FLUE GAS FOR ONE YEAR TEST PERIOD. OBTAIN PERFORMANCE AND DURABILITY DATA ON TWO OR THREE BAG STYLES (TEFLON, GLASS). PRELIMINARY PERFORMANCE TESTING ACCOMPLISHED; ENDURANCE TESTING YET TO BE STARTED.

****PROJECT: 01548-STUDIES OF DUST CAKE FORMATION AND STRUCTURE IN FABRIC FILTRATION**

STARTING/ COMPLETION DATE : 12/76 - 12/79 : FUNDING : ESTIMATED - FY77 / \$ 65517
 TASK CODE=F624A-061 **EPA=R804926 ** (GRANT) PRIOR FY /

EPA OFFICER.: JH TURNER
 INVESTIGATOR.: B MILLER
 GE LAMB
 P COSTANZA

EPA/IERL - RTP
 TEXTILE RESEARCH INST
 TEXTILE RESEARCH INST
 TEXTILE RESEARCH INST

MILESTONES....: 12/76 -GRANT AWARDED
 01/78 -YEARLY REPORT
 01/79 -YEARLY REPORT
 01/80 -FINAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001548 SSIE-GMA 3584 EPA -R804926
 AP -624A DU -L110 LABT-EMI TASK-F624A-061

ABSTRACT.....: IMPROVEMENTS IN FABRIC FILTER PERFORMANCE OBTAINED BY CONTROL OF ELEMENTAL FIBER GEOMETRY, FABRIC CONSTRUCTION, OR APPLIED ELECTRIC FIELDS ARE BELIEVED TO DEPEND ON DIFFERENCES IN THE STRUCTURE OF THE DEPOSITED DUST LAYER OR CAKE. THE OBJECT OF THE PROPOSED RESEARCH IS TO IDENTIFY THOSE FEATURES OF THE DIFFERENT DUST CAKES WHICH CAN ACCOUNT FOR DIFFERENCES IN FILTER PERFORMANCE. THIS WILL BE ACCOMPLISHED BY SCANNING ELECTRON MICROSCOPICAL STUDIES USING KNOWN TECHNIQUES AND POSSIBLY NEW TECHNIQUES TO BE DEVELOPED IN THE COURSE OF THE PROJECT. ON THE BASIS OF THE INFORMATION SO ACQUIRED, IMPROVED FABRIC CONSTRUCTIONS WILL BE DEVELOPED IN WHICH THE TENDENCY TO DEPOSIT DUST CAKES WITH DESIRABLE FEATURES WILL BE MAXIMIZED.

****PROJECT: 01549-HIGH-VELOCITY FABRIC FILTRATION**

STARTING/ COMPLETION DATE : 08/76 - 08/79 : FUNDING : ESTIMATED - FY77 / \$ 41119
 TASK CODE=F624A-062 **EPA=R804700-02 ** (GRANT) PRIOR FY76 / \$ 63031

EPA OFFICER.: JH TURNER
 INVESTIGATOR.: MW FIRST
 D LEITH

EPA/IERL - RTP
 HARVARD UNIV
 HARVARD UNIV

SCH OF PUBLIC HLTH
 SCH OF PUBLIC HLTH

MILESTONES....: 08/76 -GRANT AWARDED
 09/77 -YEARLY REPORT
 09/78 -YEARLY REPORT
 09/79 -FINAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001549 SSIE-GMA 3305 1 EPA -R804700-02
 AP -624A DU -L110 LABT-EMI TASK-F624A-062

ABSTRACT.....: IF FABRIC FILTERS CAN BE MADE TO OPERATE AT HIGHER THAN CONVENTIONAL VELOCITY, A PROPORTIONAL REDUCTION IN FILTER SIZE AND INITIAL COST WILL BE POSSIBLE, MAKING THESE EFFICIENT COLLECTORS ATTRACTIVE FOR MANY APPLICATIONS WHERE THEY ARE NOT CURRENTLY USED. FOR EXAMPLE, A HIGH-VELOCITY FILTER OPERATING AT A SUPERFICIAL FILTRATION VELOCITY OF 25 CM/S (AIR TO CLOTH RATIO OF 50 CFM/SQUARE FOOT) NEED BE ONLY 1 TO 25 PER CENT AS LARGE AS A UNIT OPERATING AT CONVENTIONAL VELOCITIES. THE OBJECTIVES OF THIS PROJECT ARE: (1) TO STUDY THE PRACTICALITY OF HIGH-VELOCITY FABRIC FILTRATION, (2) TO INVESTIGATE PHENOMENA WHICH LIMIT EFFECTIVE HIGH-VELOCITY OPERATION, AND (3) TO DEVELOP MATHEMATICAL MODELS TO INTERPRET AND PREDICT FABRIC FILTER PERFORMANCE. THESE OBJECTIVES WILL BE MET USING EXPERIMENTAL WORK WITH A THREE-BAG PILOT-SCALE FILTER CLEANED BY THE PULSE-JET PRINCIPLE, AND THEORETICAL WORK TO DESCRIBE FILTER PERFORMANCE MATHEMATICALLY.

****PROJECT: 01545-DEMONSTRATION OF BAGHOUSE FOR COLLECTION OF FLY ASH FROM LOW SULFUR COAL**

STARTING/ COMPLETION DATE : 10/77 - 01/80 : FUNDING : ESTIMATED - FY77 / \$ 763000
 TASK CODE=F624A-059 **EPA=68-02-2659 ** (CNTR.) PRIOR FY /

EPA OFFICER.: JH TURNER
 INVESTIGATOR.: K LADD

EPA/IERL - RTP
 SW PUBLIC SERV CD

MILESTONES....: 10/77 -AWARD CONTRACT
 07/78 -BEGIN ONE YEAR TEST
 02/80 -FINAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001545 SSIE-GMA 4625 EPA -68-02-2659
 AP -624A DU -L110 LABT-EMI TASK-F624A-059

ABSTRACT.....: APPROACH: OPERATE FULL SCALE BAGHOUSE FOR ONE YEAR (WITH OPTION FOR FURTHER TIME) AND COLLECT INFORMATION ON OPERATION, PERFORMANCE, COST, MAINTENANCE AND PROBLEMS ASSOCIATED TO THE BAGHOUSE ON A 350 MEGAWATT BOILER. PROGRESS: BAGHOUSE UNDER CONSTRUCTION.

****PROJECT: 01550-FINE PARTICLE CONTROL WITH UNIVERSITY OF WASHINGTON ELECTROSTATIC SCRUBBER**

STARTING/ COMPLETION DATE : 03/76 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 115265
 TASK CODE=F624A-063 **EPA=R804393 ** (GRANT) PRIOR FY76 / \$ 74485
 EPA OFFICER.: DL HARMON
 INVESTIGATOR.: MJ PILOT
 MILESTONES....: 03/76 -GRANT FUNDED
 06/77 -COMPLETE TEST ON ELECTRIC ARC FURNACE
 10/77 -COMPLETE TEST ON COAL-FIRED POWER PLANT
 01/78 -COMPLETE 3RD TEST
 03/78 -FINAL REPORT
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: REC-N-001550 SSIE-GMA 4133 EPA -R804393 TASK-F624A-063
 AP -624A DU -L110 LABT-EMI
 ABSTRACT.....: OBJECTIVE: DEMONSTRATE THE EFFECTIVENESS OF THE UNIVERSITY OF WASHINGTON ELECTROSTATIC SCRUBBER FOR
 CONTROLLING THE EMISSIONS OF FINE PARTICLES FROM POWER PLANTS AND INDUSTRIAL PLANTS. APPROACH:
 CONSTRUCT A MOBILE ELECTROSTATIC SCRUBBER AND TEST THE DEVICE ON 3 OR 4 SOURCES IN THE FIELD.
 CURRENT PLANS/PROGRESS: THE UNIT HAS BEEN COMPLETED AND TESTING ON AN ELECTRIC ARC FURNACE IN A
 STEEL MILL HAS BEEN COMPLETED. TESTING ON A COAL-FIRED POWER PLANT IS SCHEDULED.

****PROJECT: 01551-DEMONSTRATION OF SODIUM CONDITIONING**

STARTING/ COMPLETION DATE : 10/77 - 01/79 : FUNDING : ESTIMATED - FY77 / \$ 200178
 TASK CODE=F624A-064 **EPA=68-02-2656 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: LE SPARKS
 INVESTIGATOR.: UNKNOWN
 MILESTONES....: 09/77 -SIGN CONTRACT
 01/78 -SELECT SITE AND BEGIN DESIGN
 06/78 -START UP DEMONSTRATION SYSTEM
 01/79 -COMPLETE STUDY AND ISSUE REPORT
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: REC-N-001551 SSIE-GMA 4630 EPA -68-02-2656 TASK-F624A-064
 AP -624A DU -L110 LABT-EMI
 ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO DEMONSTRATE THAT SODIUM CONDITIONING CAN REDUCE FLY ASH
 ELECTRICAL RESISTIVITY AND THUS IMPROVE PARTICULATE COLLECTION BY ELECTROSTATIC PRECIPITATORS. THE
 OBJECTIVE WILL BE MET BY CONDUCTING A FULL-SCALE DEMONSTRATION OF SODIUM CONDITIONING TECHNOLOGY AT
 A SMALL POWER PLANT WHEN LOW SULFUR COAL IS BEING BURNED. END ITEM WILL BE A REPORT DOCUMENTING THE
 DEMONSTRATION AND WILL INCLUDE DESIGN INFORMATION TO ALLOW OTHERS TO USE THE SYSTEM. POTENTIAL
 USERS INCLUDE ALL UTILITIES BURNING OR PLANNING TO BURN LOW SULFUR COAL.

****PROJECT: 01554-STUDY OPERATING CHARACTERISTICS OF HOT-SIDE PRECIPITATORS**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 148666
 TASK CODE=F624A-066 **EPA=R805324-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: LE SPARKS
 INVESTIGATOR.: GA RINARD
 DE RUGG
 WA ALFORD
 TD NEVENS
 WJ CULBERTSON
 RE PRESSEY
 MILESTONES....: 09/77 -AWARD GRANT
 09/79 -ISSUE FINAL REPORT WITH SUGGESTED DESIGN CHANGES
 PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: REC-N-001554 SSIE-GMA 4626 EPA -R805324-01 TASK-F624A-066
 AP -624A DU -L110 LABT-EMI
 ABSTRACT.....: HOT-SIDE PRECIPITATORS, THOSE INSTALLED BEFORE THE COMBUSTION PREHEATER IN COAL-FIRED GENERATING
 PLANTS, ARE ONE MEANS OF IMPROVING THE EFFICIENCY OF COLLECTION OF HIGH RESISTIVITY FLY ASH. THE
 OBJECTIVE OF THE RESEARCH PROJECT IS TO STUDY THESE HOT-SIDE UNITS AND DETERMINE THE CAUSE FOR AN
 APPARENT DECREASED EFFICIENCY AT HIGH ALTITUDE. A SECOND OBJECTIVE IS TO GAIN A BETTER
 UNDERSTANDING OF HOT-SIDE UNITS IN GENERAL. A SURVEY OF OPERATING HOT-SIDE PRECIPITATORS WILL BE
 CONDUCTED TO DETERMINE IF ALTITUDE IS CLEARLY A FACTOR IN REDUCED EFFICIENCY. THE SURVEY WILL ALSO
 PROVIDE DATA THAT WILL BE CORRELATED TO DETERMINE OTHER CAUSES FOR REDUCED EFFICIENCY. THE
 EXPERIMENTAL WORK TO BE CONDUCTED WILL DEPEND ON THE OUTCOME OF THE SURVEY.

****PROJECT: 01555-RESIDENCE TIME DISTRIBUTIONS, DISPERSION AND REENTRAINMENT IN A PILOT-SCALE ELECTROSTATIC PRECIPITATOR**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 42992
 TASK CODE=F624A-067 **EPA=R805404-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: L SPARKS
 INVESTIGATOR.: RM FELDER
 JK FERRELL
 K VERGHESE

EPA/IERL - RTP
 UNIVERSITY OF NORTH CAROLINA
 UNIVERSITY OF NORTH CAROLINA
 UNIVERSITY OF NORTH CAROLINA

MILESTONES...: 09/77 -AWARD GRANT

09/79 -PUBLISH DESIGN MODEL INCORPORATING RESULTS OF RESEARCH

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION

ORDIS CODES...: REC-N-001555 SSIE-GMA 4622 EPA -R805404-01

AP -624A DU -L110 LABT-EMI

TASK-F624A-067

ABSTRACT.....: GAS AND SOLID PHASE RESIDENCE TIME DISTRIBUTIONS IN THE NERC CONTROL SYSTEMS LABORATORY PILOT-SCALE ELECTROSTATIC PRECIPITATOR WILL BE MEASURED BY TRACER RESPONSE ANALYSIS. THE RESULTS WILL BE USED TO CHARACTERIZE THE FLOW AND MIXING PATTERNS IN THE UNIT, AND TO PROVIDE A DATA BASE FOR TESTING AND MODIFYING A MODEL FOR ELECTROSTATIC PRECIPITATION FORMULATED BY THE SOUTHERN RESEARCH INSTITUTE. SPECIFIC SYSTEM PROPERTIES TO BE DETERMINED BY ANALYZING THE TRACER RESPONSES WILL INCLUDE THE FRACTIONAL SNEAKAGE, EXISTENCE AND EXTENT OF STAGNANT ZONES, EFFECTIVE AXIAL DISPERSION IN EACH PHASE, AND RATES OF REENTRAINMENT DUE TO PARTICLE IMPACTION ON THE COLLECTION PLATES, SWEEPAGE IN THE COLLECTION HOPPER, AND RAPPING. THE RESULTS WILL BE USED TO DETERMINE WHICH OF THE SPECIFIED PHENOMENA MIGHT ACCOUNT IN PART FOR DISCREPANCIES BETWEEN MEASURED COLLECTION EFFICIENCIES AND EFFICIENCIES PREDICTED BY THE SRI MODEL, AND THE MODEL WILL BE MODIFIED TO ACCOUNT FOR THE PHENOMENA FOUND TO BE SIGNIFICANT.

****PROJECT: 01556-PILOT-SCALE DEMONSTRATION OF FINE PARTICLE RESISTIVITY/HIGH-RESISTIVITY ELECTROSTATIC PRECIPITATORS**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 150000
 TASK CODE=F624A-069 **EPA=68-02-2193 ** (CNTR.) PRIOR FY /

EPA OFFICER.: LE SPARKS
 INVESTIGATOR.: UNKNOWN
 MILESTONES...: 10/77 -AWARD CONTRACT

EPA/IERL - RTP
 SOUTHERN RESEARCH INST

08/78 -COMPLETE DESIGN OF DEMONSTRATION ELECTROSTATIC PRECIPITATOR

07/79 -COMPLETE DEMONSTRATION

10/79 -ISSUE ALL REPORTS DOCUMENTATING THE DEMONSTRATION

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION

ORDIS CODES...: REC-N-001556 SSIE-GMA 4629 EPA -68-02-2193

AP -624A DU -L110 LABT-EMI

TASK-F624A-069

ABSTRACT.....: THE OBJECTIVE OF THIS EFFECT IS TO DEMONSTRATE AT LARGE PILOT-SCALE AN ELECTROSTATIC PRECIPITATOR FOR HIGH-EFFICIENCY COLLECTION OF HIGH-RESISTIVITY DUSTS. THE OBJECTIVE WILL BE MET BY CONDUCTING A PILOT-SCALE DEMONSTRATION AT A POWER PLANT WHERE LOW SULFUR COAL IS BEING BURNED. END ITEMS WILL BE A FINAL REPORT DOCUMENTATING THE DEMONSTRATION AND DOCUMENTS TO TRANSFER TECHNOLOGY TO INDUSTRY. USERS WILL BE UTILITIES AND OTHER INDUSTRIES WHERE HIGH-RESISTIVITY DUSTS ARE A PROBLEM.

****PROJECT: 01557-FINE PARTICULATE CONTROL BY HIGH GRADIENT MAGNETIC SEPARATION (HGMS)**

STARTING/ COMPLETION DATE : 06/75 - 08/79 : FUNDING : ESTIMATED - FY77 / \$ 200000
 TASK CODE=F624A-070 **EPA=68-02-1879 ** (CNTR.) PRIOR FY75 / \$ 200000

EPA OFFICER.: DC DREHME
 INVESTIGATOR.: FO MIXON
 CH GOODING
 P MORSTON

EPA/IERL - RTP
 RESEARCH TRIANGLE INST
 RESEARCH TRIANGLE INST
 SALA MAGNETICS INC

MILESTONES...: 06/75 -AWARD CONTRACT

07/77 -COMPLETE FEASIBILITY TESTS AT SMALL SCALE

08/79 -COMPLETE FIELD PILOT DEMONSTRATION

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION

ORDIS CODES...: REC-N-001557 SSIE-GMA 2276 1 EPA -68-02-1879

AP -624A DU -L110 LABT-EMI

TASK-F624A-070

ABSTRACT.....: OBJECTIVE: TO DEMONSTRATE THE FEASIBILITY OF USING A HIGH GRADIENT MAGNETIC SEPARATION (HGMS) SYSTEM AS AN EFFECTIVE AND ECONOMIC TECHNIQUE FOR CONTROL OF FINE PARTICULATE EMISSIONS. APPROACH: PHASE I OF THE PROJECT WILL INCLUDE A REVIEW OF THE THEORETICAL CONCEPTS OF HGMS AS APPLIED TO FINE PARTICLE COLLECTION WITH EMPHASIS ON COLLECTION EFFICIENCY, COLLECTOR REGENERATION, AND POWER AND RESIDENCE TIME REQUIREMENTS. BENCH SCALE EXPERIMENTS WILL FOLLOW TO VERIFY OR DISPROVE THE THEORETICAL PREDICTIONS. A PRELIMINARY ANALYSIS OF CAPITAL AND OPERATING COSTS WILL BE PERFORMED TO COMPARE THE SYSTEM TO CONVENTIONAL EQUIPMENT, I.E., SCRUBBERS, ELECTROSTATIC PRECIPITATORS OR FABRIC FILTERS. IF THE RESULTS OBTAINED IN PHASE I ARE TECHNICALLY AND ECONOMICALLY ATTRACTIVE, PHASE II WILL CONSIST OF THE DESIGN, CONSTRUCTION AND OPERATION OF AN EXPERIMENTAL MODEL OF AT LEAST 500 CFM CAPACITY TO OBTAIN ADDITIONAL INFORMATION ON THE PERFORMANCE OF THE HGMS SYSTEM WITH RESPECT TO POWER INPUT, RESIDENCE TIME, TEMPERATURE, PARTICULATE TYPE, AND PARTICULATE SIZE DISTRIBUTION. PHASE III WILL CONSIST OF A 3000 CFM PILOT DEMONSTRATION AT A PLANT SITE. OUTPUTS: DEMONSTRATED CONTROL TECHNOLOGY FOR POTENTIAL PARTICULATE AIR POLLUTANTS WHICH ARE FERROMAGNETIC OR HIGHLY PARAMAGNETIC, USERS WOULD INCLUDE THE FERROALLOY AND IRON AND STEEL INDUSTRIES.

****PROJECT: 01558-TECHNOLOGY TRANSFER FOR SCRUBBERS**

STARTING/ COMPLETION DATE : 09/76 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 10000
 TASK CODE=F624A-071 **EPA=68-02-2190 ** (CNTR.) PRIOR FY76 / \$ 50000

EPA OFFICER.: DC DREHMEL EPA/IERL - RTP
 INVESTIGATOR.: R PARKER AIR POLLUTION TECH INC
 S CALVERT AIR POLLUTION TECH INC
 R PATTERSON AIR POLLUTION TECH INC

MILESTONES....: 09/76 -CONTRACT AWARD
 05/77 -CONDUCT SCRUBBER CONFERENCE
 09/77 -REPORT ON SCRUBBER PROGRAMS
 11/77 -REPORT ON APPLICATION AREAS FOR DRY SCRUBBING
 01/78 -EXECUTIVE SUMMARIES OF CURRENT RESEARCH
 03/78 -REPORT ON SCRUBBER PERFORMANCE MODELS

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION TASK-F624A-071
 ORDIS CODES...: RECN-001558 SSIE-GMA 3110 1 EPA -68-02-2190
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVE: PROVIDE CURRENT INFORMATION ON ADVANCES IN SCRUBBER TECHNOLOGY TO POTENTIAL USERS.
 APPROACHES: THIS PROJECT IS TO CONDUCT A TECHNOLOGY TRANSFER CONFERENCE DEALING WITH NOVEL DEVICE
 AND SCRUBBER CONTROL TECHNOLOGY. IN ADDITION, THE SYMPOSIUM PROCEEDINGS WILL BE COMPILED AND
 PRINTED, THREE SPECIAL REPORTS WILL BE WRITTEN, AND SIX EXECUTIVE SUMMARIES WILL BE PREPARED AND
 COMPILED INTO A REPORT. OUTPUTS: THE FIRST CONFERENCE WAS HELD IN THE EASTERN U. S. DURING THE
 SPRING OF 1977.

****PROJECT: 01559-DESIGN AND CONSTRUCTION OF A VERSATILE FABRIC FILTER TEST UNIT**

STARTING/ COMPLETION DATE : 03/76 - 11/77 : FUNDING : ESTIMATED - FY77 / \$ 68288
 TASK CODE=F624A-072 **EPA=68-02-2151 ** (CNTR.) PRIOR FY76 / \$ 301000

EPA OFFICER.: GH RAMSEY EPA/IERL - RTP AEROTHERM DIV
 INVESTIGATOR.: FE MORENO ACUREX CORP AEROTHERM DIV
 RW FULTON ACUREX CORP AEROTHERM DIV
 JJ REESE ACUREX CORP AEROTHERM DIV
 DR BLANN ACUREX CORP AEROTHERM DIV

MILESTONES....: 03/76 -CONTRACT SIGNED
 06/76 -DESIGN DRAWINGS OF VERSATILE FABRIC FILTER TEST UNIT
 08/76 -PROCUREMENT OF ALL PARTS
 10/76 -ASSEMBLY OF UNIT AT CONTRACTOR'S LOCATION
 02/77 -SHIPMENT
 05/77 -INSTALLATION AT RTP
 11/77 -SHAKEDOWN AND DEMONSTRATION TESTS

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION TASK-F624A-072
 ORDIS CODES...: RECN-001559 SSIE-GMA 4167 EPA -68-02-2151
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVES: TO DESIGN, FABRICATE, INSTALL AND TEST IN THE IERL LABORATORY IN RESEARCH TRIANGLE PARK.
 N.C., A VERSATILE, HIGH-TEMPERATURE (TO 1500 DEGREES F) FABRIC FILTER TEST UNIT WHICH CAN CONTROL
 THE GAS COMPOSITION, PARTICULATE LEADING AND HUMIDITY OF THE INLET STREAM. APPROACH: A FABRIC
 FILTER TEST UNIT WILL BE DESIGNED, FABRICATED AND INSTALLED WHICH WILL ALLOW FOR THE TESTING OF
 FOUR TUBULAR (35 1/2" X 5" DIAMETER) FABRIC FILTERS IN INDEPENDENT TEST CHAMBERS. INLET PARTICULATE
 LOADING, TEMPERATURE, GAS COMPOSITION, FILTER FACE VELOCITY AND HUMIDITY WILL BE CONTROLLED BY THE
 UNIT. ADDITIONAL INSTRUMENTATION WILL BE DESIGNED WHICH WILL MEASURE AND LOG OTHER PARAMETERS
 AFFECTING FILTER LIFE. CURRENT PLANS: A DESIGN WILL BE GENERATED DURING THE INITIAL 4 MONTHS OF THE
 CONTRACT. THIS DESIGN WILL BE REVIEWED BEFORE PARTS PROCUREMENT AND FABRICATION BEGIN. PARTIAL
 FABRICATION OF THE TEST UNIT WILL BE ACCOMPLISHED AT AEROTHERM (MOUNTAIN VIEW, CALIFORNIA) PRIOR TO
 THE SHIPMENT OF THE DEVICE TO THE EPA IN DECEMBER 1976. INSTALLATION IN THE IERL LABORATORY IS
 SCHEDULED TO BEGIN IN JANUARY 1977. UNIT DEMONSTRATION TESTS WILL BE CONDUCTED IN SEPTEMBER 1977.

****PROJECT: 01580-DESIGN, FABRICATE, AND INSTALL A PILOT-SCALE ELECTROSTATIC PRECIPITATOR**

STARTING/ COMPLETION DATE : 11/75 - 03/77 : FUNDING : ESTIMATED - FY77 / \$ 86813
 TASK CODE=F624A-073 **EPA=68-02-2129 ** (CNTR.) PRIOR FY76 / \$ 261679

EPA OFFICER.: GH RAMSEY EPA/IERL - RTP
 INVESTIGATOR.: GA RINARD UNIVERSITY OF DENVER
 FP VENDITTI UNIVERSITY OF DENVER
 WJ CULBERTSON UNIVERSITY OF DENVER
 TD NEVENS UNIVERSITY OF DENVER
 WA ALFORD UNIVERSITY OF DENVER

MILESTONES....: 11/75 -CONTRACT SIGNED
 03/76 -TECHNICAL SURVEY REPORT OF ESP EXPERTS
 05/76 -DESIGN DRAWINGS OF ESP SYSTEM
 11/76 -FABRICATION OF ESP AT CONTRACTOR'S SITE
 02/77 -SHIPPING OF UNIT TO RTP, N.C.
 04/77 -INSTALLATION AND CHECKOUT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001560 SSIE-GMA 3097 1 EPA -68-02-2129 TASK-F624A-073
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVE: THE OBJECTIVE OF THE PROJECT IS TO PROVIDE A PILOT-SCALE ELECTROSTATIC PRECIPITATOR (ESP) AT THE RESEARCH EPA FACILITY IN RESEARCH TRIANGLE PARK, N. C. THE ESP WILL PROVIDE MAXIMUM FLEXIBILITY, AND ACCURACY CONSISTENT WITH THE BASIC REQUIREMENT THAT ITS GENERAL CONFIGURATION BE SIMILAR TO THAT OF FULL-SCALE ELECTROSTATIC PRECIPITATORS. A BURNER, HUMIDIFIER, AND A SPECIALLY DESIGNED AEROSOL GENERATOR WILL BE INCLUDED IN ORDER TO PROVIDE A WIDE VARIETY OF ATMOSPHERES IN THE PRECIPITATOR UNIT. APPROACH: PHASE 1: PRIOR TO DESIGNING THE PRECIPITATOR, A SURVEY OF EXISTING PILOT-SCALE INSTALLATIONS WILL BE MADE AND EXPERTS IN THE FIELD OF ESP DESIGN AND APPLICATION WILL BE INTERVIEWED. WITH THESE BACKGROUND DATA, THE FEATURES AND PARAMETERS OF THE PILOT SCALE ESP WILL BE ESTABLISHED AND THE DESIGN WILL BE UNDERTAKEN. PHASE 2: THE SECOND PART OF THE EFFORT WILL BE TO FABRICATE AND ASSEMBLE THE PRECIPITATOR AT THE CHERRY CREEK FIELD SITE FACILITY OF THE UNIVERSITY OF DENVER FOR CHECK-OUT. HAVING PROVEN THE UNIT, IT WILL BE PARTIALLY DISMANTLED, SHIPPED TO RESEARCH TRIANGLE PARK, N.C. AND RE-ASSEMBLED. CURRENT PLANS/PROGRESS: THE ESP SYSTEM HAS BEEN INSTALLED AT RESEARCH TRIANGLE PARK, NC.

****PROJECT: 01575-OPERATION OF IERL-RTP TEST FACILITIES**

STARTING/ COMPLETION DATE : 07/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 390000
 TASK CODE=F624A-088 **EPA=68-02-2646 ** (CNTR.) PRIOR FY /

EPA OFFICER.: CV BRISCOE EPA/IERL - RTP
 INVESTIGATOR.: DR BLANN ACUREX CORP AEROTHERM DIV
 S SCHLIESSER ACUREX CORP AEROTHERM DIV
 C DENE ACUREX CORP AEROTHERM DIV
 R CLAYTON ACUREX CORP AEROTHERM DIV

MILESTONES....: 00/00 -N/A - TECHNICAL DIRECTIVE TYPE CONTROL

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001575 SSIE-GMA 4198 EPA -68-02-2646 TASK-F624A-088
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: TO OPERATE AND MAINTAIN INDUSTRIAL AND ENVIRONMENTAL RESEARCH LABORATORY TEST FACILITIES LOCATED AT WING G OF THE ERC, RTP. THESE FACILITIES INCLUDE TWO PILOT MODEL SO2 SCRUBBERS, ONE OPERATING IN THE LIME/LIMESTONE MODE AND THE OTHER UTILIZING THE DOUBLE-ALKALI PROCESS, A MOBILE FABRIC FILTER, MOBILE WET SCRUBBER, MOBILE ELECTROSTATIC PRECIPITATOR, AND AERODYNAMIC TEST CHAMBER, A MOBILE ANALYTICAL LABORATORY TRAILER, A MOBILE ANALYTICAL LABORATORY VAN, FLUIDIZED-BED COMBUSTOR TEST RIG, AND THE EPA VAN FOR CLEAN ENERGY.

****PROJECT: 01615-DEMONSTRATION OF NOVEL FINE PARTICULATE COLLECTION SYSTEM**

STARTING/ COMPLETION DATE : 09/77 - 03/79 : FUNDING : ESTIMATED - FY77 / \$ 357209
 TASK CODE=F624A-65 **EPA=68-02-2666 ** (CNTR.) PRIOR FY /

EPA OFFICER.: DL HARMON EPA/IERL - RTP
 INVESTIGATOR.: UNKNOWN AIR POLLUTION SYSS INC

MILESTONES....: 09/77 -FUND CONTRACT
 08/78 -COMPLETE DEVICE INSTALLATION
 12/78 -COMPLETE TESTING
 03/79 -FINAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION
 ORDIS CODES...: RECN-001615 SSIE-GMA 4684 EPA -68-02-2666 TASK-F624A-65
 AP -624A DU -L110 LABT-EMI

ABSTRACT.....: OBJECTIVE: DEMONSTRATE AT PILOT SCALE THE TECHNICAL AND ECONOMIC FEASIBILITY OF A NOVEL PARTICULATE COLLECTION SYSTEM FOR CONTROL OF FINE PARTICULATE EMISSIONS FROM INDUSTRIAL SOURCES. APPROACH: SELECT A NOVEL PARTICULATE COLLECTION SYSTEM WHICH HAS PROMISE FOR EFFICIENT FINE PARTICLE COLLECTION. DESIGN, FABRICATE, INSTALL AND TEST THIS SYSTEM ON A FINE PARTICULATE SOURCE. CURRENT PLANS/PROGRESS: CONTRACTOR SELECTION IS UNDERWAY.

****PROJECT: 01818-EVALUATION AND ASSESSMENT OF METHODS FOR COLLECTING FLY ASH FROM
COMBUSTION OF LOW-SULFUR COALS**

STARTING/ COMPLETION DATE : 10/77 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 102686
TASK CODE=F624A-68 **EPA-68-02-2652 ** (CNTR.) PRIOR FY /

EPA OFFICER.: LE SPARKS
INVESTIGATOR.: UNKNOWN
MILESTONES...: 09/77 -AWARD CONTRACT
09/78 -ISSUE FINAL REPORT

PLAN ID.....: (AP-624A)(DU-L110) UTILITY AND INDUSTRIAL POWER PRODUCTION

ORDIS CODES...: RECN-001616 SSIE-GMA 4692 EPA -68-02-2652 TASK-F624A-68
AP -624A DU -L110 LABT-EMI

ABSTRACT.....: THE OBJECTIVE IS TO EVALUATE AND ASSESS THE ECONOMICS, PERFORMANCE AND GENERAL SUITABILITY OF
ELECTROSTATIC PRECIPITATOR FABRIC FILTER AND WET SCRUBBER TECHNOLOGY FOR CONTROL OF PARTICULATE
EMISSIONS FROM COMBUSTION OF LOW SULFUR COAL. THE OBJECTIVE WILL BE ACCOMPLISHED BY SURVEYING
UTILITIES AND BY DESIGNING AND COSTING "TYPICAL" POWER PLANTS TO DETERMINE IMPACT OF PARTICULATE
CONTROL DEVICE CHOICE ON COST. A REPORT DETAILING THE RESULTS OF THE STUDY WILL BE PUBLISHED.
INFORMATION TO BE USED BY EPA, STATE AGENCIES, AND INDUSTRY TO DEVELOP OPTIMUM STRATEGIES FOR
CONTROLLING EMISSIONS FROM COMBUSTION OF COAL.

Health and Environmental Effects

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Health and Environmental Effects Program

This research and development program within the Interagency Energy/Environment Program is designed to determine which energy-related pollutants are harmful to man, as well as their origin, transformation, and overall impact on the environment.

The following sections describe briefly the health and environmental effects research and development ongoing within each interagency research category, highlighting typical research in that area.

Ecological Effects

This program has the overall goal of assessing the environmental effects of present and proposed energy development activities on ocean, coastal, estuarine and atmospheric/terrestrial ecosystems.

Research conducted by EPA, the Department of Energy (DOE), the Fish and Wildlife Service (USFWS), the National Institute of Environmental Health Sciences (NIEHS), Department of Agriculture (USDA), and the National Oceanic and Atmospheric Administration (NOAA) supports the goals of this program by determining the nature and effects of pollutants resulting from the extraction of coal, oil, oil shale, and natural gas from land and water. Contamination levels, resulting from oil and gas drilling operations, and the thermal impacts of energy development are being determined in both marine and aquatic ecosystems.

Projects typifying these research goals are toxicity testing in the Gulf of Mexico to assess the ecological effects of oil and gas exploration and extraction, studies on the aquatic effects of coal extraction in the mid-west; experiments with varied techniques of land reclamation for strip mined areas, expansion of the existing USDA acid rain monitoring network to cover the midwestern farm belt, and studies in the New England area to determine the effects of offshore drilling fluids on the marine community.

Transport and Fate

The goals of this program are to characterize, assess, and develop predictive models of the movement of energy-related pollutants in the air, water, and soil, their transformation into secondary pollutants, and their ultimate fate and impact on man and his environment.

In accomplishing these goals, the sources and nature of these pollutants are being determined. Included in this research are emissions from conventional power plants (coal, oil, gas) and from advanced energy technologies such as coal gasification and liquefaction, oil shale extraction, and geothermal energy developments. Finally, primary pollutant transformation to secondary pollutants through interaction with various meteorological factors such as wind, precipitation, and solar activity is being investigated.

Measurement Systems and Instrumentation

The Measurement Systems and Instrumentation efforts are primarily aimed at identifying the source and amount of pollution associated with expanding western energy resource development, increased

offshore oil developments and towards developing appropriate instrumentation and measurement capabilities.

The major objective of these efforts is to establish a useful data base to anticipate the multimedia environmental impacts of accelerated energy resource development in these areas, and also to validate sampling and analytical techniques to ensure accurate measurement capability.

EPA, the U.S. Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), and the National Aeronautics and Space Administration (NASA) are working together to monitor air and water quality land use patterns in the western energy development areas through such projects as continued aerial surveys, initiation of a joint EPA/NASA program using satellite imagery to study sulfate transport and transformation in air masses, continued operation of the Water and Air Quality Assurance Program for the Western Energy/Environment Monitoring Study. In addition these agencies are also striving for the development of instrumentation systems to measure atmospheric particulates, marine pollutants, stream velocity, and the chemical nature of energy-related effluents.

Health Effects

This research program is dedicated to improving the ability to estimate the long-term adverse health impacts that can ensue as a consequence of implementing a particular energy policy.

Under the auspices of the Interagency Program, EPA, DOE, NIEHS and National Institute of Occupational Safety and Health (NIOSH) are working together to study the health effects caused by coal extraction and combustion, and emerging energy technologies. With the current emphasis on coal, much of the program's energies focus on research on carcinogenic (cancer causing) substances released through combustion of coal.

To this end EPA, DOE, NIEHS, and NIOSH developed and implemented the concept of interagency workshops to evaluate the state-of-the-art relative to the health and ecological effects of advanced energy system development, as well as making contributions to the development of a blue-ribbon panel report (RALL Committee) on the health impacts of increased coal usage, both in response to the President's requests in his energy message.

Ecological Effects

****PROJECT: 03584-ALASKAN OIL SEEPS - THEIR CHEMICAL AND BIOLOGICAL EFFECTS ON THE ENVIRONMENT**

STARTING/ COMPLETION DATE : 06/75 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 123991
 TASK CODE=M625A-003 **EPA-R803922-03 ** (GRANT) PRIOR FY76 / \$ 253523
 EPA OFFICER.: FB LOTSPEICH EPA/ERL - CORVALLIS FAIRBANKS CAMPUS
 INVESTIGATOR.: DG SHAW UNIV OF ALASKA
 MILESTONES.... 05/78 -FINAL REPORT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... REC-N-003584 SSIE-GMA 4260 EPA -R803922-03 TASK-M625A-003
 AP -625A DU -N140 LABT-HEE
 ABSTRACT..... OBJECTIVE IS TO RELATE A DEFINED CHRONIC INPUT OF PETROLEUM IN AN INTERTIDAL ENVIRONMENTAL TO BIOLOGICAL CHANGES AT THE ORGANISM AND COMMUNITY LEVELS. THE PROJECT WILL INVESTIGATE OIL SEEPS ALONG THE GULF OF ALASKA THAT PROVIDE LONG-TERM, LOW-LEVEL INPUT OF PETROLEUM INTO THE MARINE INTERTIDAL ENVIRONMENT.

****PROJECT: 03585-ASSESSMENT OF THE EFFECTS OF BOTTOM DISTURBANCE ON THE ENVIRONMENT OF A CLEAR SUBARCTIC STREAM**

STARTING/ COMPLETION DATE : 07/75 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 33238
 TASK CODE=M625A-004 **EPA-R803945-03 ** (GRANT) PRIOR FY76 / \$ 97347
 EPA OFFICER.: EW SCHALLOCK EPA/ERL - CORVALLIS SCH OF BIOL SCI & RENEWABLE RES
 INVESTIGATOR.: JE MORROW UNIV OF ALASKA
 MILESTONES.... 07/78 -FINAL REPORT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... REC-N-003585 SSIE-GMA 2447 2 EPA -R803945-03 TASK-M625A-004
 AP -625A DU -N140 LABT-HEE
 ABSTRACT..... THE EFFECTS OF A BURIED PIPELINE CROSSING IN THE CHATANIKA RIVER ARE BEING MONITORED. PARAMETERS CONSIDERED ARE 1) TYPE AND RATE OF FLOW; 2) OXYGEN AND CARBON DIOXIDE CONTENT OF WATER; 3) WATER TEMPERATURE; 4) SIZE TYPE AND DISTRIBUTION OF STREAM BOTTOM PARTICLES; 5) INTRA-GRAVEL WATER FLOW AND CHEMISTRY; 6) QUANTITY AND DIVERSITY OF ANIMAL AND PLANT ORGANISMS; 7) ORGANIC DRIFT; 8) PRIMARY PRODUCTIVITY. ITEMS 1) THROUGH 5) ARE HANDLED BY PERSONNEL OF THE ARCTIC ENVIRONMENTAL RESEARCH LABORATORY, EPA. RESULTS THUS FAR INDICATE SOME SILTATION DOWNSTREAM FROM THE CROSSING; LOSS OF SMALL SPAWNING GROUND FOR LONGNOSE SUCKER DOWNSTREAM FROM THE CROSSING; SOME INCREASE IN ORGANIC DRIFT; TEMPORARY INCREASE IN PRIMARY PRODUCTIVITY BELOW AS COMPARED WITH ABOVE THE CROSSING. IT IS PLANNED TO MONITOR THESE FACTORS FOR ANOTHER YEAR TO DETERMINE WHETHER THE OBSERVED EFFECTS ARE PERMANENT OR TEMPORARY.

****PROJECT: 03587-EFFECTS OF NON-GASEOUS AIRBORNE POLLUTANTS FROM COAL-FIRED POWER PLANTS ON PLANT GROWTH AND METABOLISM**

STARTING/ COMPLETION DATE : 07/75 - 10/77 : FUNDING : ESTIMATED - FY77 / \$ 92440
 TASK CODE=M625A-005 **EPA-R803948-02 ** (GRANT) PRIOR FY76 / \$ 70990
 EPA OFFICER.: E PRESTON EPA/ERL - CORVALLIS SCH OF AGRIC/ENTOMOLOGY DEPT
 INVESTIGATOR.: ER LANDA OREGON STATE UNIV
 MILESTONES.... 10/77 -FINAL REPORT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... REC-N-003587 SSIE-GMA 2778 1 EPA -R803948-02 TASK-M625A-005
 AP -625A DU -N140 LABT-HEE
 ABSTRACT..... INVESTIGATE RELECTED EFFECTS OF STACK EMISSIONS ASSOCIATED WITH COAL-BURNING ON PLANT GROWTH AND METABOLISM.

****PROJECT: 03588-EFFECTS OF CHRONIC SULFUR DIOXIDE FUMIGATION ON PRIMARY PRODUCERS AND INVERTEBRATE CONSUMERS IN A MIXED PRAIRIE ECOSYSTEM**

STARTING/ COMPLETION DATE : 06/77 - 06/80 : FUNDING : ESTIMATED - FY77 / \$ 163070
 TASK CODE=M625A-019 **EPA-R805320-01 ** (GRANT) PRIOR FY / \$
 EPA OFFICER.: E PRESTON EPA/ERL - CORVALLIS NAT RESOURCE ECOLOGY LAB
 INVESTIGATOR.: JL DDDO COLORADO STATE UNIV NAT RESOURCE ECOLOGY LAB
 WK LAUENROTH COLORADO STATE UNIV
 MILESTONES.... 06/80 -FINAL REPORT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... REC-N-003588 SSIE-GMA 4239 EPA -R805320-01 TASK-M625A-019
 AP -625A DU -N140 LABT-HEE
 ABSTRACT..... THE OBJECTIVE OF THIS PROJECT IS TO ASSESS THE EFFECTS OF CHRONIC SULFUR DIOXIDE FUMIGATION ON PRIMARY PRODUCERS AND INVERTEBRATE CONSUMERS IN A MIXED PRAIRIE ECOSYSTEM. FIELD EXPERIMENTS ARE DESIGNED TO: (1) CHARACTERIZE PHYSIOLOGICAL RESPONSES OF WESTERN WHEATGRASS TO FOUR SO2 EXPOSURE LEVELS, (2) RELATE PHYSIOLOGICAL RESPONSES TO WHOLE PLANT GROWTH AND POPULATION DYNAMICS OF WESTERN WHEATGRASS ON EACH TREATMENT AREA; (3) INVESTIGATE THE RELATIONSHIPS BETWEEN PHYSIOLOGICAL STATUS OF WESTERN WHEATGRASS AND INFRARED REFLECTIONS. LABORATORY EXPERIMENTS SUPPORT AND AMPLIFY THE FIELD EXPERIMENTS. THESE EXPERIMENTS ARE DESIGNED TO: (1) CHARACTERIZE THE PHYSIOLOGICAL RESPONSE OF WESTERN WHEATGRASS TO SO2 FUMIGATION WITHIN A MINOR RANGE OF ENVIRONMENTAL CONDITIONS, AND (2) DETERMINE THE RELATIONSHIP BETWEEN INTERNAL SULFUR STATUS OF WESTERN WHEATGRASS AND PHYSIOLOGICAL RESPONSES. VARIABLES TO BE MEASURED INCLUDE GROSS PHOTOSYNTHESIS, NET PHOTOSYNTHESIS, PHOTOSPIRATION, DARK RESPIRATION, PLANT AND LEAF WATER POTENTIAL, STAMATA DIFFUSION RESISTANCE AND LEAF TEMPERATURES.

****PROJECT: 03590-USE OF LICHENS AS PREDICTORS AND INDICATORS OF AIR POLLUTION FROM A COAL-FIRED POWER PLANT**

STARTING/ COMPLETION DATE : 09/77 - 08/80 : FUNDING : ESTIMATED - FY77 / \$ 13604
 TASK CODE=M625A-020 **EPA-R805367-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: E PRESTON EPA/ERL - CORVALLIS SCH OF LETTERS & SCI
 INVESTIGATOR.: S EVERSMAN MONTANA STATE UNIV
 MILESTONES....: 07/80 -FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: REC-N-003590 SSIE-GMA 4241 EPA -R805367-01 TASK-M625A-020
 AP -625A DU -N140 LABT-HEE

ABSTRACT.....: TWO LICHEN SPECIES NATIVE TO SOUTHEAST MONTANA SHOWED REDUCED RESPIRATION RATES AND ALGAL CELL PLASMOLYSIS AND BLEACHING WHEN EXPOSED TO .02, .04, AND .07 PPM SO₂ (GEOMETRIC MEANS) ON A FIELD FUMIGATION SITE. THE MAJOR OBJECTIVE OF THE CURRENT PROJECT IS TO COLLECT THESE SAME TWO LICHEN SPECIES TO BE OBSERVED AS BIOLOGICAL MONITORS OF SO₂ EMISSIONS FROM TWO COAL-FIRED POWER PLANTS IN COLSTRIP, MONTANA. LICHEN COMMUNITY INFORMATION IS ALSO BEING COLLECTED IN ORDER TO DETECT ANY CHANGES IN EPIPHYTIC AND SOIL LICHEN COMMUNITIES AS COAL BURNING PROCEEDS IN THIS AREA. ALL THE LICHEN INFORMATION WILL BE INTEGRATED WITH PLANT COMMUNITY DATA GATHERED BY OTHER RESEARCHERS IN THE AREA IN ORDER TO DETERMINE EFFECTS OF SO₂ EMISSIONS (AND OTHER COAL-BURNING POLLUTANTS) ON PONDEROSA PINE-GRASSLAND ECOSYSTEMS.

****PROJECT: 03592-INVESTIGATION OF THE EFFECTS OF COAL-FIRED POWER PLANT EMISSIONS ON TISSUE STRUCTURE OF SELECTED BIRD SPECIES - BIRDS AS INDICAT**

STARTING/ COMPLETION DATE : 07/77 - 07/80 : FUNDING : ESTIMATED - FY77 / \$ 27154
 TASK CODE=M625A-021 **EPA-R805370-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: E PRESTON EPA/ERL - CORVALLIS GRADUATE SCH
 INVESTIGATOR.: MD KERN COLLEGE OF WOOSTER
 MILESTONES....: 07/80 -FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: REC-N-003592 SSIE-GMA 4235 EPA -R805370-01 TASK-M625A-021
 AP -625A DU -N140 LABT-HEE

ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO IDENTIFY SPECIES OF GRASSLAND BIRDS AND/OR THEIR ORGAN-SYSTEMS WHICH ARE PARTICULARLY SENSITIVE TO THE EMISSIONS OF COAL-FIRED POWER PLANTS AND CAN BE USED TO MONITOR AND INDICATE AIR QUALITY, AND SO PREDICT THE IMPACT OF CHRONIC, LOW-LEVEL, NON-LETHAL STACK EMISSIONS ON THE SURROUNDING ECOSYSTEM. THE STUDY SITE IS A GRASSLAND ECOSYSTEM IN COLSTRIP, MONTANA, IN WHICH TWO COAL-FIRED POWER PLANTS OPERATE. REPRESENTATIVE GRASSLAND BIRDS SELECTED FOR STUDY AT THE SITE ARE THE WESTERN MEADOWLARK (STURNELLA NEGLECTA), MOURNING DOVE (ZENAIIDURA MACROURA), LARK BUNTING (CALAMOSIOZA MELANOCORYS), VESPER SPARROW (POOECETES GRAMINEUS, AND LARK SPARROW (CHONDESTES GRAMMACUS). IN EACH CASE, THE HISTOLOGY OF THE FOLLOWING TISSUES IS EXAMINED BEFORE (1975-1979) THE POWER PLANTS HAVE GONE ON-LINE: (1) TISSUES WHICH ARE STRESS INDICATORS: THE ADRENAL AND THYROID GLANDS; (2) TISSUES WHICH BELONG TO THE IMMUNE SYSTEM: THE BURSA OF FABRICIUS, THYMUS, AND SPLEEN; (3) DETOXIFYING TISSUES: THE LIVER, KIDNEY, AND LUNG; AND (4) REPRODUCTIVE TISSUES: THE TESTIS, OVARY, AND OVIDUCT. THIS HISTOLOGICAL INFORMATION WILL BE INTEGRATED WITH (1) MEASURES OF CARCASS AND TISSUE COMPOSITION AND OTHER GROSS MEASUREMENTS MADE ON THE SAME BIRDS, AND (2) INFORMATION ON THE AIR QUALITY, WEATHER, AND OTHER ORGANISMS IN THE SAME IMPACTED ECOSYSTEM, IN ORDER TO IDENTIFY RELATIONSHIPS WHICH ARE USEFUL FOR (1) PREDICTING THE BIOLOGICAL EFFECTS OF GIVEN RATES OF POLLUTION CHALLENGE, AND (2) SITING COAL-FIRED POWER PLANTS IN THE GREAT PLAINS REGION.

****PROJECT: 03594-MONITORING PLANT COMMUNITY CHANGES DUE TO FOSSIL FUEL POWER PLANTS IN SOUTHEASTERN MONTANA**

STARTING/ COMPLETION DATE : 07/77 - 07/80 : FUNDING : ESTIMATED - FY77 / \$ 52766
 TASK CODE=M625A-023 **EPA-R805391-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: E PRESTON EPA/ERL - CORVALLIS SCH OF AGRIC
 INVESTIGATOR.: JE TAYLOR MONTANA STATE UNIV
 MILESTONES....: 07/80 -FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: REC-N-003594 SSIE-GMA 4242 EPA -R805391-01 TASK-M625A-023
 AP -625A DU -N140 LABT-HEE

ABSTRACT.....: OBJECTIVES: A. TO CONTINUE TO MONITOR AIR POLLUTION EFFECTS UPON NATIVE GRASSLAND VEGETATION IN AREAS AFFECTED BY FOSSIL FUEL POWER PLANTS AND ON AREAS ARTIFICIALLY STRESSED WITH AIR POLLUTANTS; B. TO SUPPLY BASE LINE INVENTORY INFORMATION, INCLUDING AERIAL PHOTOGRAPHY AND ITS INTERPRETATION, TO A VARIETY OF SCIENTISTS, LAND USERS AND MANAGERS IN EASTERN MONTANA; C. TO PROVIDE RIGOROUS DATA FOR SIMULATION MODELS WHICH CAN BE USED TO PREDICT BIOENVIRONMENTAL CHANGES DUE TO FOSSIL FUEL POWER GENERATION IN OTHER AREAS. APPROACHES: AERIAL AND GROUND PHOTOGRAPHY, SPECIES DIVERSITY (NUMBER AND COVER), AND PHENOLOGY WILL BE RELATED TO POLLUTION STRESSES AND "NORMAL" VARIATION IN COMMUNITY STRUCTURE. PLANS: TWO YEARS' ADDITIONAL FIELD OBSERVATIONS WILL BE INCORPORATED INTO THE COAL-FIRED POWER PLANT PROTOCOL AND A VEGETATIONAL MONITORING SYSTEM.

****PROJECT: 03596-RESPONSE OF BIRDS TO ENVIRONMENTAL STRESS**

STARTING/ COMPLETION DATE : 09/77 - 09/79 : FUNDING : ESTIMATED - FY77 / \$ 29031
 TASK CODE=M625A-024 **EPA-R805409-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: E PRESTON
 INVESTIGATOR.: DS FARNER
 JC WINGFIELD
 RS DONHAM

EPA/ERL - CORVALLIS
 UNIVERSITY OF WASHINGTON
 UNIVERSITY OF WASHINGTON
 UNIVERSITY OF WASHINGTON

MILESTONES....: 08/78 -FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-003596 SSIE-GMA 4237 EPA -R805409-01 TASK-M625A-024
 AP -625A DU -N140 LABT-HEE

ABSTRACT.....: MICRO-RADIO COMPETITIVE-PROTEIN-BINDING AND MICRO-RADIOIMMUNOASSAYS FOR CORTISONE IN AVIAN PLASMA HAVE ALREADY BEEN DEVELOPED AND ADAPTED FOR FIELD INVESTIGATIONS IN THIS LABORATORY. SINCE THESE METHOD REQUIRE LESS THAN 100 MICROLITERS OF PLASMA, INDIVIDUAL BIRDS CAN BE SAMPLED, MARKED AND RELEASED FOR SUBSEQUENT CAPTURE AND SAMPLING. THE METHOD HAS BEEN "FIELD-TESTED" EXTENSIVELY ON WHITE-CROWNED SPARROWS, ZONOTRICHIA LEUCOPHRYS GAMBELII AND Z.I. PUGETENSIS. IT IS PROPOSED TO DEVELOP THIS SYSTEM FURTHER AS A MEANS OF "EARLY DETECTION" OF ENVIRONMENTAL STRESS IN POPULATIONS OF BIRDS. USING THESE METHODS, FIRST ON WHITE-CROWNED SPARROWS, THE FOLLOWING ARE PROPOSED: (1) PROCUREMENT OF BASE LINE DATA ON DAILY CYCLES IN PLASMA CORTICOSTERONE; (2) PROCUREMENT OF ADDITIONAL DATA ON EFFECTS OF HANDLING AND HOLDING IN CAGES; (3) EXAMINATION OF EFFECTS OF INDUCED STRESS IN FIELD (DISTURBANCE OF FLOCKS, HARASSMENT OF TERRITORIAL BIRDS, ARTIFICIAL DISTURBANCE OF HABITAT, ETC.); (4) DETERMINATION OF METABOLIC CLEARANCE AND HALF-LIFE OF CORTICOSTERONE IN BIRDS; AND (5) OBSERVATION OF EFFECTS OF "ARTIFICIAL STRESS" (IMPLANTATION OF CORTICOSTERONE IN SILASTIC TUBES IN TERRITORIAL BIRDS). COMPARABLE MICROASSAYS HAVE BEEN DEVELOPED FOR TESTOSTERONE AND ESTRADIOL. THE AVIAN RADIOIMMUNOASSAY OF FOLLETT, SCANES, AND CUNNINGHAM FOR LUTEINIZING HORMONE (LH) HAS BEEN MODIFIED FOR PASSERINE BIRDS. ACCURATE ESTIMATES OF LH, SEX HORMONE AND CORTICOSTERONE CAN BE MADE FROM 200 MICROLITERS OF PLASMA FROM BIRDS THAT CAN BE Banded AND RELEASED FOR SUBSEQUENT CAPTURE AND SAMPLING. LAPAROTOMY CAN BE PERFORMED ON THESE BIRDS FOR ASSESSMENT OF GONADAL STATE. FOR LH AND SEX HORMONES DATA COMPARABLE TO CORTICOSTERONE (1-3 AND 5) WILL BE OBTAINED. INSOFAR AS POSSIBLE, BY REPEATED SAMPLING OF INDIVIDUAL BIRDS. SAMPLES WILL BE ANALYZED FROM A CARNIVORE, THE WESTERN MEADOWLARK, STURNELLA NEGLECTA, AT THE EPA MONTANA COAL-FIRED POWER PLANT PROJECT, COLSTRIP, TO EVALUATE THE SIGNIFICANCE OF HISTOLOGICAL

****PROJECT: 03598-OIL SPILLS - EFFECT ON ARCTIC LAKE SYSTEMS**

STARTING/ COMPLETION DATE : 07/75 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 156180
 TASK CODE=M625A-031 **EPA-R804152-03 ** (GRANT) PRIOR FY76 / \$ 294333

EPA OFFICER.: RC GORDON
 INVESTIGATOR.: R BARSDATE
 MILESTONES....: 07/78 -FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-003598 SSIE-GMA 2449 2 EPA -R804152-03 TASK-M625A-031
 AP -625A DU -N140 LABT-HEE

ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO ASSESS THE EFFECTS OF CRUDE OIL ON HIGH LATITUDE AQUATIC ENVIRONMENTS WITH EMPHASIS ON THE EFFECTS OF OIL ON HIGH LATITUDE ARCTIC LAKES. THE PRINCIPAL ACTIVITY WILL BE THE APPLICATION OF A MODERATE SCALE EXPERIMENTAL CRUDE OIL SPILL TO AN ARCTIC LAKE IN ORDER TO OBSERVE THE IMPACT AND RECOVERY OF VARIOUS TROPHIC LEVELS FROM BACTERIA THROUGH FISH.

****PROJECT: 03599-SEASONAL CYCLES IN BODY COMPOSITION, ORGAN SYSTEM FUNCTION, AND ENERGETICS OF GRASSLAND BIRDS NEAR COLSTRIP, MONTANA**

STARTING/ COMPLETION DATE : 10/77 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 47217
 TASK CODE=M625A-036 **EPA-R805581-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: EM PRESTON
 INVESTIGATOR.: ML MORTON
 MILESTONES....: 09/78 -FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-003599 SSIE-GMA 4262 EPA -R805581-01 TASK-M625A-036
 AP -625A DU -N140 LABT-HEE

ABSTRACT.....: IN 1974 THE ENVIRONMENTAL PROTECTION AGENCY (EPA) BEGAN A LONG-TERM STUDY OF AIR POLLUTION EFFECTS ON THE GRASSLAND ECOSYSTEM NEAR COAL-FIRED POWER PLANTS AT COLSTRIP, ARIZONA. THIS STUDY IS BROAD IN SCOPE BUT ONE PARTICULAR ASPECT, OF CONCERN HERE, HAS BEEN ON THE POTENTIAL OF BIRDS AS BIOINDICATORS OF POLLUTION. IN THE THREE YEAR PERIOD, 1974-76, MANY AVIAN SPECIMENS WERE COLLECTED IN THE COLSTRIP AREA BY EPA PERSONNEL AND GREAT QUANTITIES OF DATA WERE GATHERED ON SEASONAL CYCLES IN BODY COMPOSITION, ORGAN SYSTEM FUNCTION, AND BIOENERGETICS. SINCE THE POWER PLANTS DID NOT BECOME FUNCTIONAL UNTIL 1975 AND 1976, THESE DATA HAVE THE POTENTIAL OF PROVIDING A SOLID BASE OF INFORMATION THAT CAN BE USED TO QUANTIFY POLLUTION EFFECTS WHICH MAY ACCRUE IN THE FUTURE. AT THIS TIME, HOWEVER, MANY OF THE COLLECTED BIRD SPECIMENS HAVE NOT UNDERGONE LABORATORY PROCESSING NOR HAS EXISTING DATA BEEN PULLED TOGETHER IN USEFUL FORM. IT IS THE PURPOSE OF THE STUDY PROPOSED HEREIN TO COMPLETE THE NECESSARY LABORATORY PROCEDURES ON STORED SPECIMENS, MAKE ADDITIONAL COLLECTIONS, IF NECESSARY, TO FILL INFORMATIONAL GAPS, COMPIL AND EVALUATE ALL PERTINENT DATA, AND CONSTRUCT A FINAL REPORT OF SUFFICIENT SCOPE AND DETAIL THAT WILL CONSTITUTE AN EFFECTIVE DOCUMENTATION OF BIOLOGICAL RELATION IN GRASSLAND BIRDS OF THE COLS

****PROJECT: 03801-POSSIBLE SUBLETHAL EFFECT OF PETROLEUM HYDROCARBONS ON THE PHYSIOLOGY OF TEMPERATURE ACCLIMATION IN MARINE FISHES (ABBREV)**

STARTING/ COMPLETION DATE : 10/77 - 09/79 : FUNDING : ESTIMATED - FY77 / \$ 74000
 TASK CODE=M625A-038 **EPA=R805625-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: RM BRICE EPA/ERL - CORVALLIS
 INVESTIGATOR.: RS CALDWELL OREGON STATE UNIV SCH OF AGRIC/ENTOMOLOGY DEPT
 EM CALDERONE OREGON STATE UNIV SCH OF AGRIC/ENTOMOLOGY DEPT

MILESTONES.... 08/79 -FINAL REPORT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-003601 SSIE-GMA 4224 EPA -R805625-01 TASK-M625A-038
 AP -625A DU -N140 LABT-HEE

ABSTRACT..... THE PROPOSED RESEARCH WILL TEST THE HYPOTHESIS THAT PETROLEUM HYDROCARBON COMPOUNDS CAPABLE OF INDUCING MICROSOAMAL MIXED FUNCTION OXIDASES IN FISH TISSUES INTERFERE WITH NORMAL PATTERNS OF FATTY ACID METABOLISM, SPECIFICALLY MICROSOAMAL FATTY ACID DESATURATION, AND THAT SUCH EFFECTS RESULT IN MODIFIED FATTY ACID PATTERNS IN MEMBRANE PHOSPHOLIPIDS OF FISH AND SUBOPTIMAL PHYSIOLOGICAL RESPONSES TO TEMPERATURE. TWO APPROACHES WILL BE TAKEN. IN ONE, FISH WILL BE EXPOSED TO PETROLEUM HYDROCARBONS FOR ONE TO TWO WEEKS AT AN INTERMEDIATE TEMPERATURE. FOLLOWING THIS, TREATED AND CONTROL FISH WILL BE COMPARED WITH RESPECT TO MICROSOAMAL CYTOCHROME P450 AND B5 LEVELS, MIXED FUNCTION OXIDASE AND FATTY ACID DESATURASE ACTIVITIES, FATTY ACID COMPOSITION OF MEMBRANE PHOSPHOLIPIDS, AND SEVERAL BIOPHYSICAL CHARACTERISTICS OF MEMBRANES. IN A SECOND APPROACH, FISH WILL BE ACCLIMATED TO EXTREME TEMPERATURES, BOTH IN THE PRESENCE AND ABSENCE OF PETROLEUM HYDROCARBONS, AND COMPARED WITH RESPECT TO ABILITY TO CARRY OUT KNOWN BIOCHEMICAL AND PHYSIOLOGICAL ADAPTIONS TO TEMPERATURE (E.G. TEMPERATURE MEDIATED ADJUSTMENT OF MEMBRANE FATTY ACID COMPOSITION AND THE BIOCHEMICAL AND PHYSIOLOGICAL ADAPTIONS RESULTING FROM SUCH FATTY ACID CHANGES).

****PROJECT: 03802-SUPPORT SERVICES AT FORT HOWES RANGER STATION**

STARTING/ COMPLETION DATE : 10/74 - 08/79 : FUNDING : ESTIMATED - FY77 / \$ 5500
 TASK CODE=M625A-053 **EPA=D7-F633 ** (IAG) PRIOR FY76 / \$ 24200

EPA OFFICER.: EM PRESTON EPA/ERL - CORVALLIS
 INVESTIGATOR.: RM RICHMOND USDA FOREST SERV

MILESTONES.... 00/00 -NO REPORT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-003602 SSIE-GMA 4214 EPA -D7-F633 TASK-M625A-053
 AP -625A DU -N140 LABT-HEE

ABSTRACT..... THE AGREEMENT CALLS FOR MAINTENANCE OF LIVING AND LABORATORY TRAILERS LOCATED AT FT. HOWES, MAINTENANCE OF WATER AND SEWAGE SYSTEMS, TEMPORARY STORAGE OF EQUIPMENT AND SERVICES OF A SAFETY OFFICER TO ENSURE COMPLIANCE WITH ALL APPLICABLE STANDARDS.

****PROJECT: 03803-AEROSOL CHARACTERIZATION RESEARCH -- COLSTRIP, MONTANA**

STARTING/ COMPLETION DATE : 05/75 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 57000
 TASK CODE=M625A-054 **EPA=D7-0740 ** (IAG) PRIOR FY76 / \$ 220000

EPA OFFICER.: NR GLASS EPA/ERL - CORVALLIS
 INVESTIGATOR.: VE DERR US DOC/NOAA ENV RES LABS/WAVE PROP LAB

MILESTONES.... 09/79 -FINAL REPORT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-003603 SSIE-GMA 4210 EPA -D7-0740 TASK-M625A-054
 AP -625A DU -N140 LABT-HEE

ABSTRACT..... PROJECT INVOLVES THE MEASUREMENT OF THE CONCENTRATION OF PARTICULATES CATEGORIZED BY SIZE, SHAPE AND CHEMICAL CONSTITUTION. TWO RADIATION MEASUREMENTS WILL BE MADE: (1) RATE AT WHICH SOLAR ENERGY REACHES THE EARTH AS A FUNCTION OF WAVELENGTH, AND (2) THE NET HEAT LOSS OF THE EARTH WILL BE MEASURED BY INFRARED RADIOMETRY BY MEASURING UPWARD AND DOWNWARD RADIATION AND BY EMPLOYING AIRCRAFT AND GROUND-BASED INSTR

****PROJECT: 03805-OIL MOVEMENT ON SOIL ACTIVE LAYER**

STARTING/ COMPLETION DATE : 06/75 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 75000
 TASK CODE=M625A-055 **EPA=D7-0794 ** (IAG) PRIOR FY76 / \$ 199575

EPA OFFICER.: R MCFADDEN EPA/ERL - CORVALLIS
 INVESTIGATOR.: TT MCFADDEN US DOD/ARMY ENG CORPS COLD REGIONS RES & ENG LAB

MILESTONES.... 05/78 -FINAL REPORT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-003605 SSIE-GMA 4211 EPA -D7-0794 TASK-M625A-055
 AP -625A DU -N140 LABT-HEE

ABSTRACT..... THE OBJECTIVE IS TO EVALUATE THE RATE AND EXTENT OF OIL MOVEMENT IN AND OVER THE SOIL ACTIVE LAYER, AND TO DETERMINE TRANSPORT PATHWAYS, FATE OF POLLUTANTS, AND DEGRADATION BY-PRODUCTS, FOLLOWING A SIMULATED OIL SPILL OF HOT CRUDE OIL ON A PERMAFROST UNDERLAIN SLOPE.

****PROJECT: 03606-CHARACTERIZING THE AIR QUALITY IN THE COLSTRIP, MONTANA AREA**

STARTING/ COMPLETION DATE : 06/75 - 11/78 : FUNDING : ESTIMATED - FY77 / \$ 119000
 TASK CODE=M625A-057 **EPA=D7-0840 ** (IAG) PRIOR FY76 / \$ 100000
 EPA OFFICER.: NR GLASS EPA/ERL - CORVALLIS RICHLAND OPERATIONS OFF
 INVESTIGATOR.: TW AMBROSE US DOE
 TW AMBROSE BATTELLE MEMORIAL INST

MILESTONES...: 11/78 -FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: REC-N-003606 SSIE-GMA 4220 EPA -D7-0840 TASK-M625A-057
 AP -625A DU -N140 LABT-HEE

ABSTRACT.....: ERDA WILL OPERATE AND MAINTAIN A RESEARCH SURVEY STATION FOR THE ENVIRONMENTAL PROTECTION AGENCY AT COLSTRIP, MONTANA, PROVIDING APPROXIMATELY 1 MAN-YEAR OF EFFORT. ERDA WILL MAINTAIN A SCIENTIST AT COLSTRIP WHO WILL OPERATE RESEARCH EQUIPMENT, AS REQUIRED BY EPA, FOR THE MEASUREMENT OF A WIDE SPECTRUM OF AIRBORNE POLLUTANTS. IT IS UNDERSTOOD THAT THESE POLLUTANTS INCLUDE THE MEASUREMENTS OF MOST OF THE CONVENTIONAL AIR POLLUTANTS WHICH ARE MONITORED BY THE EPA AND WILL REQUIRE DAILY CALIBRATIONS OF MUCH OF THE SCIENTIFIC EQUIPMENT USED FOR THESE MEASUREMENTS. IT WILL ALSO REQUIRE THE TRANSFER OF DATA FROM THE VARIOUS ANALYZERS TO AN ON-BOARD COMPUTER FOR SUBSEQUENT ANALYSIS AND TRANSMITTAL.

****PROJECT: 03608-MONTANA COAL-FIRED POWER PLANT BIOENVIRONMENTAL STUDY**

STARTING/ COMPLETION DATE : 07/74 - 06/80 : FUNDING : ESTIMATED - FY77 / \$ 369094
 TASK CODE=M625A-088 **EPA= ** (IN-HO) PRIOR FY76 / \$ 406500
 IN-HOUSE EFFORT : FY 77 / 01.0 YEARS ; TOTAL PROJECT 09.0
 EPA OFFICER.: NR GLASS EPA/ERL - CORVALLIS ERL/TERR ECOL BR
 INVESTIGATOR.: NR GLASS US EPA/ORD
 MILESTONES...: 00/00 -ANNUAL REPORTS
 06/80 -FINAL REPORT

PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: REC-N-003608 SSIE-ZMA 1154 TASK-M625A-088 AP -625A
 DU -N140 LABT-HEE

ABSTRACT.....: THE TWO OBJECTIVES OF THIS PROGRAM ARE: (1) TO DEVELOP PROCEDURES WHICH CAN BE USED TO FORECAST AND ASSESS THE IMPACTS OF STRESSANTS FROM ENERGY-PRODUCING ACTIVITIES ON AFFECTED ECOSYSTEMS; AND (2) TO IDENTIFY AND DESCRIBE THE IMPACTS FOR A GIVEN SET OF ECOSYSTEMS. THE APPROACH IS TO COMBINE FIELD MEASUREMENTS WITH ON-SITE FIELD EXPERIMENTATION AND LABORATORY PROCESS STUDIES. REMOTE SENSING, MODELING ACTIVITIES, AND OTHER ASSOCIATED SUPPORTIVE EFFORTS WILL BE UTILIZED TO MAXIMIZE THE ACTIVITY. THE CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY HAS MOUNTED A FIELD EFFORT IN MONTANA. BESIDES THE NORMAL FIELD FACILITIES (MOBILE AIR QUALITY LABORATORIES, BIOLOGICAL ANALYSIS SYSTEMS, ETC.) AN EFFORT HAS BEEN MADE TO COORDINATE THE PROJECT WITH OTHER SCIENTIFIC CENTERS (GRASSLAND IBP, ERDA, EPA AND NOAA) TO INCLUDE THE NECESSARY SCIENTIFIC AND ENGINEERING EXPERTISE TO GUARANTEE A UNIFIED PROGRAM. IT IS INTENDED THAT THE RESEARCH INFORMATION GATHERED FROM THIS PROJECT BE UTILIZED IN SUCH A FASHION THAT A SET OF BIOLOGICAL PARAMETERS ARE FOUND THAT WILL ALLOW PLANNING MANAGERS TO PROJECT COST/BENEFIT RELATIONSHIPS PRIOR TO LOCATING AN ENERGY-PRODUCING FACILITY.

****PROJECT: 03610-LABORATORY SUPPORT SERVICES FOR C.E.R.L.**

STARTING/ COMPLETION DATE : 12/76 - 12/77 : FUNDING : ESTIMATED - FY77 / \$ 13732
 TASK CODE=M625A-090 **EPA=68-03-2505 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: G PHILLIPS EPA/ERL - CORVALLIS NORTHROP SERVS INC
 INVESTIGATOR.: NM PETTIT NORTHROP CORP

MILESTONES...: 12/77 -FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: REC-N-003610 SSIE-GMA 4513 EPA -68-03-2505 TASK-M625A-090
 AP -625A DU -N140 LABT-HEE

ABSTRACT.....: THIS IS ONE OF A MULTI-PART PROJECT WHOSE SUMMARY MAY BE IDENTICAL TO OTHERS. THE CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY PLANS AND CONDUCTS RESEARCH PROGRAMS TO DETERMINE THE EFFECTS OF ENVIRONMENTAL POLLUTANTS ON TERRESTRIAL AND AQUATIC ECOSYSTEMS. THESE RESEARCH PROJECTS INVOLVED EXPERIMENTS TO EVALUATE THE RESPONSE OF PLANTS AND ANIMALS WHEN EXPOSED TO POLLUTANTS. THESE DATA ARE PROCESSED AND ANALYZED TO PROVIDE INFORMATION REQUIRED FOR THE SOLUTION OF EPA PROBLEMS.

****PROJECT: 03611-MULTIDISCIPLINARY RESEARCH ON SUBSYSTEMS OF COMPLEX FOREST ECOSYSTEMS**

STARTING/ COMPLETION DATE : 05/75 - 12/77 : FUNDING : ESTIMATED - FY77 / \$ 10000
 TASK CODE=M625A-092 **EPA=D7-F469 ** (IAG) PRIOR FY /
 EPA OFFICER.: RG WILHOOR EPA/ERL - CORVALLIS PAC NW FOREST & RANGE EXP STA
 INVESTIGATOR.: JL STEWART USDA/FOREST SERV

MILESTONES...: 12/77 -FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: REC-N-003611 SSIE-GMA 4465 EPA -D7-F469 TASK-M625A-092
 AP -625A DU -N140 LABT-HEE

ABSTRACT.....: A STATISTICAL ANALYSIS OF THE ECOLOGICAL EFFECTS OF AIR POLLUTION SHALL EMPHASIZE THE DEVELOPMENT OF COMMUNITY LEVEL INDICES OF POLLUTION IMPACTS. MULTIVARIATE STATISTICAL METHODS SHALL BE USED TO DETERMINE CHANGES IN COMMUNITY STRUCTURE RELATED TO POLLUTION GRADIENTS AND OTHER ENVIRONMENTAL VARIABLES. A REPORT ON THE STATISTICAL ANALYSIS OF COMMUNITY STRUCTURE ON NORTHERN GREAT PLAINS ECOSYSTEM WILL BE PREPARED.

****PROJECT: 03612-MODIFICATION OF THE OPTIMIZED EPRF MULTILAYER HYDRODYNAMICAL-NUMERICAL MODEL**

STARTING/ COMPLETION DATE : 06/75 - 06/77 : FUNDING : ESTIMATED - FY77 / \$ 10000
 TASK CODE=M625A-094 **EPA=68-03-2225 ** (CNTR.) PRIOR FY75 / \$ 47000
 EPA OFFICER.: RJ CALLAWAY EPA/ERL - CORVALLIS
 INVESTIGATOR.: RA BAUER COMPASS SYSS INC
 MILESTONES....: 06/77 -FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-003612 SSIE-GMA 4457 EPA -68-03-2225 TASK-M625A-094
 AP -625A DU -N140 LABT-HEE
 ABSTRACT.....: THE EFFORT HAS FOUR GOALS: 1) THE ADDITION OF CONVECTIVE TERMS TO THE EPRF VERSION OF THE HN MODEL OF THE HANSEN TYPE AND THE TESTING OF THE MODIFIED MODEL ON A SMALL GEOGRAPHIC AREA; 2) THE ADDITION OF THE CAPABILITY TO HANDLE VARIABLE LAND BOUNDARIES (TIDAL FLATS); 3) THE ADDITION OF THE THERMAL DISCHARGE ADVECTION EFFECTS; AND 4) THE DEVELOPMENT OF A MONTE CARLO PROCEDURE FOR USE IN CONJUNCTION WITH THE VELOCITIES CALCULATED BY THE HN MODEL TO COMPUTE DISPERSION OF A CONSERVATIVE MAT

****PROJECT: 03757-CONTINUOUS FLOW BIOASSAYS USING NATURAL PERIPHYTON COMMUNITIES WITH EMPHASIS ON THE EFFECTS OF COAL LEACHATE**

STARTING/ COMPLETION DATE : 07/75 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 55369
 TASK CODE=N625A-079 **EPA=R803932-03 ** (GRANT) PRIOR FY76 / \$ 55000
 EPA OFFICER.: W MILLER EPA/ERL - DULUTH
 INVESTIGATOR.: DZ GERHART UNIV OF MINNESOTA GRADUATE SCH
 LL HOLMETRAND UNIV OF MINNESOTA GRADUATE SCH
 TJ WOOD UNIV OF MINNESOTA GRADUATE SCH
 JR RICHTER UNIV OF MINNESOTA GRADUATE SCH
 MILESTONES....: 01/76 -QUANTIFIED EFFECTS OF COAL LEACHATE ON PERIPHYTON COMMUNITIES
 06/76 -IDENTIFIED STIMULATORY AND INHIBITORY LEACHATE COMPONENTS
 05/78 -IDENTIFY SYNERGISTIC OR AGONISTIC LEACHATE INTERACTIONS
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-003757 SSIE-GMA 2783 1 EPA -R803932-03 TASK-N625A-079
 AP -625A DU -N140 LABT-HEE
 ABSTRACT.....: OBJECTIVE OF THIS PROJECT ARE: 1) TO QUANTIFY THE EFFECTS OF COAL LEACHATE ON SPECIES COMPOSITION AND STRUCTURES OF PERIPHYTON COMMUNITIES; 2) TO IDENTIFY LEACHATE COMPONENTS WITH INHIBITORY OR STIMULATOR EFFECTS; 3) TO ELUCIDATE POSSIBLE SYNERGISTIC OR ANTAGONISTIC INTERACTIONS AMONG LEACHATE COMPONENTS. APPROACH: PERIPHYTON COMMUNITIES ARE GROWN IN LABORATORY STREAMS ON ARTIFICIAL SUBSTRATES. THE BIOASSAY FACILITY UTILIZES WATER FROM LAKE SUPERIOR AND IS LOCATED AT THE EPA'S NATIONAL ENVIRONMENTAL RESEARCH LABORATORY IN DULUTH, MINNESOTA. IN EXPERIMENTS WHICH LAST FROM 3 TO 8 WEEKS, PERIPHYTON COMMUNITIES ARE DUSED WITH VARIOUS CONCENTRATIONS OF COAL LEACHATE, COAL DISTILLATE, OR FRACTIONS THEREOF, AND GROWTH RESPONSE IS MEASURED AS CHANGES IN BIOMASS (CHLOROPHYLL AND ASH-FREE DRY WEIGHT). ALGAL COMMUNITIES ARE ALSO EXAMINED MICROSCOPICALLY TO DETECT CHANGES IN SPECIES COMPOSITION AND DIVERSITY. CURRENT PLANS AND PROGRESS: COAL LEACHATE APPEARS TO STIMULATE THE GROWTH OF ALGAE. CURRENT EFFORTS ARE FOCUSING ON IDENTIFYING THE SPECIFIC CHEMICAL FACTORS RESPONSIBLE FOR THIS EFFECT.

****PROJECT: 03758-ORGANIC LEACHING AND PARTICULATE DISPERSION FROM COAL**

STARTING/ COMPLETION DATE : 07/75 - 06/78 : FUNDING : ESTIMATED - FY77 / \$ 180000
 TASK CODE=N625A-081 **EPA=R803952-03 ** (GRANT) PRIOR FY76 / \$ 145839
 EPA OFFICER.: DV KUEHL EPA/ERL - DULUTH
 INVESTIGATOR.: M SYDOR UNIVERSITY OF MINNESOTA
 R CAPLE UNIVERSITY OF MINNESOTA
 RM CARLSON UNIVERSITY OF MINNESOTA
 MILESTONES....: 05/77 -CHLORINATION OF DISSOLVED POLYNUCLEAR AROMATICS
 06/77 -QUANTITATION OF POLYNUCLEAR AROMATIC HYDROCARBONS IN H2O BY HPLC- GC
 07/77 -A SELECTIVE SYNTHESIS OF POLYMETHYLATED NAPHTHALENES
 07/77 -END ON 2ND YEAR PROGRESS REPORT
 07/77 -TRANSPORT IN THE DULUTH HARBOR
 06/77 -HEPATIC MIXED-FUNCTION OXIDASE ACTIVITY IN RAINBOW TROUT EXPOSED TO
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-003758 SSIE-GMA 2758 2 EPA -R803952-03 TASK-N625A-081
 AP -625A DU -N140 LABT-HEE
 ABSTRACT.....: A MAJOR THRUST OF THIS PROJECT WILL REMAIN THE MONITORING OF POLYNUCLEAR AROMATIC HYDROCARBONS (PAH'S) AT THE MICROPOLLUTANT LEVEL (PPM OR LESS). THE HIGH PRESSURE LIQUID CHROMATOGRAPHY-GAS CHROMATOGRAPHY (HPLC-GC) IDENTIFICATION METHODOLOGY DEVELOPED IN THESE LABORATORIES FOR THE ANALYSIS OF TRACE PAH'S IN COAL LEACHATES, AND IN GENERAL WATER SAMPLES, WILL BE EXTENDED AND APPLIED TO SUCH PROBLEMS AS THE BIOCONCENTRATION OF PAH'S IN FISH TISSUE, AIDING IN THE ANALYSIS OF "SECOND-ORDER" PAH'S (I.E., METABOLITES, PHOTOCHEMICAL OXIDATION PRODUCTS, AQUEOUS DISINFECTION PRODUCTS), AND IN THE PAH ANALYSIS OF COAL STEAM DISTILLATES. THE ULTIMATE GOAL OF THE PROPOSED INVESTIGATION IS TO DETERMINE THE LONG RANGE INFLUENCE OF A COAL LOADING FACILITY ON A GREAT LAKE HARBOR IN TERMS OF TRANSPORT OF COAL PARTICULATE MATTER, USING PHYSICAL AND CHEMICAL MEASUREMENTS AND APPLICATION OF NUMERICAL MODELING FOR WATER QUALITY TO THE DULUTH-SUPERIOR HARBOR.

****PROJECT: 03761-THE IMPACT OF COAL-FIRED POWER PLANTS ON THE ENVIRONMENT**

STARTING/ COMPLETION DATE : 07/75 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 339991
 TASK CODE=N625A-082 **EPA=R803971-04 ** (GRANT) PRIOR FY76 / \$ 708405
 EPA OFFICER.: G GLASS EPA/ERL - DULUTH LETTERS & SCI/CHEM DEPT
 INVESTIGATOR.: DL LOUCKS UNIV OF WISCONSIN
 MILESTONES....: 00/74 -COMPLETE BASE LINE DATA GATHERING-AIR, WATER, PLANTS AND ANIMALS
 03/76 -COMPLETE CONSTRUCTION IMPACTS OF POWER PLANT AND COOLING LAKE
 12/77 -COMPLETE DATA GATHERING ON SHORT-TERM IMPACTS OF OPERATION
 07/78 -COMPLETE DRAFT SITING CRITERIA DOCUMENT
 07/78 -COMPLETE MAJOR REPORTS ON ALL IMPACTS ON UNIT 1
 07/78 -COMPLETE MAJOR REPORTS ON ALL IMPACTS OF UNIT 2
 07/79 -COMPLETE DATA GATHERING ON SHORT-TERM IMPACTS OF UNITS 1 AND 2
 07/80 -COMPLETE MAJOR REPORTS ON ALL IMPACTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-003761 SSIE-GMA 2772 1 EPA -R803971-04 TASK-N625A-082
 AP -625A DU -N140 LABT-HEE

ABSTRACT.....: THIS PROPOSAL REQUESTS SUPPORT TO CONTINUE INVESTIGATION OF ENVIRONMENTAL CHANGES DUE TO CONSTRUCTION AND OPERATION OF A COAL-FIRED POWER GENERATING STATION, TWO UNITS 527 MEGAWATTS EACH. ORIGINALLY RESEARCH WAS COMMENCED IN 1971 UNDER A GRANT FROM THREE WISCONSIN POWER COMPANIES. THE THIRD YEAR OF THE CURRENT PHASE OF THE PROJECT WILL BE COMPLETED IN JULY 1978. THE SITE IS ON THE FLOODPLAIN OF THE WISCONSIN RIVER NEAR PORTAGE, WISCONSIN. PRIMARY ATTENTION IS GIVEN TO THE IMPACT ON THE AQUATIC ENVIRONMENT. THE APPROACH IS INTER-DISCIPLINARY, WITH DISCRETE SECTIONS FOCUSED ON: AQUATIC INVERTEBRATES, FISH, HYDROGEOLOGY, WATER USE ANALYSIS, WETLANDS ECOLOGY, REMOTE SENSING, AQUATIC CHEMISTRY, HAZARDOUS CHEMICALS IN FISH, ASSESSMENT OF A COOLING SYSTEM, METEOROLOGY, AIR POLLUTION MODELLING, PLANT DAMAGE, TRACE ELEMENTS, ORGANIC CONTAMINANTS, PLUME CHEMISTRY, VISUAL CHANGES, MASS FLOW AND BALANCE OF WATER, AIR, AND CHEMICALS. DATA AVAILABLE THROUGH THE COLUMBIA DATA BANK, IES, MADISON. A PORTION OF THE STUDY IS DEVELOPING, IN CONCERT WITH THE WISCONSIN PUBLIC SERVICE COMMISSION, THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES, AND THREE WISCONSIN PUBLIC UTILITIES, CRITERIA FOR THE SITING OF GENERATING FACILITIES.

****PROJECT: 03839-EFFECTS OF THERMAL ADDITIONS ON THE DYNAMICS OF FOULING COMMUNITIES AT BEAUFORT, NC**

STARTING/ COMPLETION DATE : 12/75 - 12/78 : FUNDING : ESTIMATED - FY77 / \$ 70000
 TASK CODE=P625A-01 **EPA=R803856-02 ** (GRANT) PRIOR FY75 / \$ 54702
 EPA OFFICER.: D. MILLER EPA/ERL - NARR
 INVESTIGATOR.: JP SUTHERLAND DUKE UNIV
 WW KIRBYSMITH DUKE UNIV
 MILESTONES....: 12/78 -FINAL REPORT ENTITLED "EFFECTS OF THERMAL ADDITIONS ON THE DYNAMICS OF FOULING COMMUNITIES AT BEAUFORT, NC"
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-003839 SSIE-GMA 4249 EPA -R803856-02 TASK-P625A-01
 AP -625A DU -N140 LABT-HEE
 ABSTRACT.....: CONSTRUCTION OF A LABORATORY SYSTEM WHICH WILL PROVIDE RUNNING SEAWATER AT AMBIENT TEMPERATURE AND AT 2 DEGREES C, 4 DEGREES C, AND 8 DEGREES C ABOVE AMBIENT. FOULING DEVELOPMENT AND CHANGES IN FOULING COMMUNITY STRUCTURE WILL BE FOLLOWED AT EACH TEMPERATURE FOR SEVERAL YEARS ON CLAY TILE PLATES (232 CM2) SUBMERGED IN OCTOBER 1975 AND APRIL 1976. LARVAL RECRUITMENT AT EACH TEMPERATURE WILL ALSO BE MONITORED. PARALLEL EXPERIMENTS WILL BE CONDUCTED SIMULTANEOUSLY ON PLATES SUBMERGED UNDER THE DUKE MARINE LAB DOCK. DATA WILL BE USED TO DETERMINE THE EFFECT OF HEATED EFFLUENTS ON COMMUNITY STRUCTURE AND FUNCTION.

****PROJECT: 03841-A FACILITY FOR THE EXPERIMENTAL ANALYSIS OF COASTAL MARINE ECOSYSTEMS**

STARTING/ COMPLETION DATE : 07/77 - 06/78 : FUNDING : ESTIMATED - FY77 / \$ 980000
 TASK CODE=P625A-07 **EPA=R803902-03 ** (GRANT) PRIOR FY76 / \$ 1960955
 EPA OFFICER.: ED SCHNEIDER EPA/ERL - NARR SCH OF OCEANOGRAPHY
 INVESTIGATOR.: JA KNAUSS UNIV OF RHODE ISLAND SCH OF OCEANOGRAPHY
 S NIXON UNIV OF RHODE ISLAND SCH OF OCEANOGRAPHY
 M PILSON UNIV OF RHODE ISLAND SCH OF OCEANOGRAPHY
 T SMAYDA UNIV OF RHODE ISLAND
 MILESTONES....: 06/78 -FINAL REPORT ENTITLED "A FACILITY FOR THE EXPERIMENTAL ANALYSIS OF COASTAL MARINE ECOSYSTEMS"
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-003841 SSIE-GMA 2735 1 EPA -R803902-03 TASK-P625A-07
 AP -625A DU -N140 LABT-HEE
 ABSTRACT.....: OBJECTIVES: A) TO DEVELOP A FACILITY AND METHODOLOGY FOR THE EXPERIMENTAL ANALYSIS OF COASTAL MARINE ECOSYSTEMS AND THEIR RESPONSE TO ENERGY-RELATED ENVIRONMENTAL STRESSES B) TO RELATE THE EXPERIMENTAL RESULTS TO ECOSYSTEM THEORY AND ITS IMPLICATIONS FOR THE MANAGEMENT OF COASTAL MARINE ENVIRONMENTS. APPROACH: REPLICATE MESO-SCALE EXPERIMENTAL ECOSYSTEMS SIMULATING A VARIETY OF COMMON COASTAL MARINE ENVIRONMENTS WILL BE DEVELOPED AND MAINTAINED AT A SPECIAL SHORE-BASED LABORATORY. A NUMBER OF STRESSES OR ENVIRONMENTAL PERTURBATIONS ASSOCIATED WITH ENERGY DEVELOPMENT WILL THEN BE APPLIED OVER A RANGE OF INTENSITIES TO THESE SYSTEMS BEFORE, DURING, AND AFTER THE APPLICATION OF STRESS. SIMILAR FIELD EXPERIMENTS MAY ALSO BE CARRIED OUT ON A SMALL SCALE IN SOME ENVIRONMENTS. CURRENT PLANS: THE FIRST PROJECT WILL INVOLVE 9 SHORE-BASED EXPERIMENTAL WATER COLUMNS (5M DEEP X 2M DIA.) WITH ASSOCIATED BOTTOM SEDIMENTS AND BENTHOS. THE MICROCOSMS WILL FIRST BE STUDIED FOR REPLICABILITY AND FOR DIFFERENCES BETWEEN TANKS THAT ARE RUN AS OPEN OR CLOSED SYSTEMS WITH RESPECT TO SEA-WATER FLOW. AFTER THIS PRELIMINARY WORK IS COMPLETED, A SERIES OF EXPERIMENTS INVOLVING THE ADDITION OF WATER SOLUBLE PETROLEUM HYDROCARBONS AT CONCENTRATIONS OF 100 AND 1000 UG/L WILL BEGIN.

****PROJECT: 03863-ISOLATION AND STUDY OF CHLORO-ORGANICS RESULTING FROM CHLORINATION OF SEAWATER**

STARTING/ COMPLETION DATE : 07/75 - 05/79 : FUNDING : ESTIMATED - FY77 / \$ 230000
 TASK CODE=Q625A-1-01 **EPA-R803893-03 ** (GRANT) PRIOR FY76 / \$ 350000
 EPA OFFICER.: WP DAVIS EPA/ERL -GULF BREEZE
 INVESTIGATOR.: JH CARPENTER UNIV OF MIAMI
 CA SMITH MAR & ATMOS SCI/CHEM OCEANOGRAPHY
 MILESTONES.... 05/79 -FINAL REPORT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... REC-003863 SSIE-GMA 2478 2 EPA -R803893-03 TASK-Q625A-1-01
 AP -625A DU -N140 LABT-HEE
 ABSTRACT..... THE PROPOSED RESEARCH SEEKS TO IDENTIFY THE CHLORINE-CONTAINING AND BROMINE-CONTAINING ORGANIC COMPOUNDS THAT ARE FORMED WHEN CHLORINE IS ADDED TO SEAWATER. INITIAL EMPHASIS WOULD BE PLACED ON STUDY OF REACTION CONDITIONS THAT OCCUR DURING POWER PLANT OPERATION; I.E., UP TO 2 HOURS AT TEMPERATURES UP TO 38 DEGREES C WITH AND WITHOUT SUNLIGHT. TOTAL ORGANIC HALOGENATED COMPOUNDS YIELD WOULD BE MEASURED. THE REACTION PRODUCTS WOULD BE FRACTIONATED, USING SELECTIVE SOLUBILITY AND THIN LAYER CHROMATOGRAPHY. CHARACTERIZATION WOULD BE CARRIED OUT USING GAS CHROMATOGRAPHIC-MASS SPECTRAL TECHNIQUES AND ADDITIONAL CHARACTERIZATION WOULD BE BASED ON UV AND IR SPECTRA WITH NMR FOR SPECIAL CASES.

****PROJECT: 03864-ADP TECHNICAL SUPPORT SERVICES**

STARTING/ COMPLETION DATE : 10/76 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=Q625A-1-02 **EPA-D7-01000 ** (IAG) PRIOR FY /
 EPA OFFICER.: TT DAVIES EPA/ERL -GULF BREEZE
 INVESTIGATOR.: R MCCUTCHEN US GENERAL SERVS ADMIN
 MILESTONES.... 05/77 -BEGIN DATA BASE MANAGEMENT SYSTEM
 12/77 -ATTACH STATISTICAL SERVICE NEEDS TO DATA BASE SERVICE
 06/78 -OPERATE WATER QUALITY MODELS FOR ESTUARIES
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... REC-003864 SSIE-ZMA 1112 EPA -D7-01000 TASK-Q625A-1-02
 AP -625A DU -N140 LABT-HEE
 ABSTRACT..... THE PURPOSE OF THIS IAG IS TO PROVIDE ADP TECHNICAL SERVICES IN SUPPORT OF THE ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE, RESEARCH PROGRAM. THIS INCLUDES WORK IN SUPPORT OF THE BEARS BLUFF FIELD STATION OF THE ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE. THIS WILL INCLUDE SUPPORT OF THE MODELLING PROGRAM ON THE FATE, PERSISTENCE AND EFFECTS OF TOXIC MATERIALS ON COASTAL WATERS, STATISTICAL SERVICES IN THE LABORATORY AND DATA BASE MANAGEMENT OF THE TOXICOLOGY PROGRAM.

****PROJECT: 03866-SUBLETHAL EFFECTS OF CHLORINE ON VASCULAR PLANTS AND DECAPOD CRUSTACEANS**

STARTING/ COMPLETION DATE : 07/75 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 112000
 TASK CODE=Q625A-1-03 **EPA-R803872-02 ** (GRANT) PRIOR FY76 / \$ 71000
 EPA OFFICER.: WP DAVIS EPA/ERL -GULF BREEZE
 INVESTIGATOR.: MH ROBERTS VIRGINIA INST OF MARINE SCI
 MILESTONES.... 09/77 -FINAL REPORT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... REC-003866 SSIE-GMA 2635 2 EPA -R803872-02 TASK-Q625A-1-03
 AP -625A DU -N140 LABT-HEE
 ABSTRACT..... THE OBJECTIVES OF THE RESEARCH ARE TO DEFINE EFFECTS OF CONTINUOUS EXPOSURE TO CHLORINE ON LARVAL DEVELOPMENT, JUVENILE GROWTH, AND REPRODUCTIVE PARAMETERS, FOR TWO SELECTED MARINE DECAPOD CRUSTACEANS, PANEOPUS HERBSTII AND PAGURUS LONGICARPUS. ADDITIONALLY THE EFFECTS OF CHLORINE ON DEVELOPMENT OF THE COOT CLAM, MULLINIA LATERALIS, AND BLOOD SERUM CONSTITUENTS OF THE BLUE CRAB CALLINECTES SAPIDUS WILL BE STUDIED. PRELIMINARY DATA SUGGEST THAT RESPONSES OCCUR ONLY AT CHLORINE DOSES CLOSE TO THE LETHAL CONCENTRATION. RELIABLE TEST SYSTEMS DEVELOPED TO DATE WILL BE USED TO DEFINE CHLORINE EFFECTS.

****PROJECT: 03867-DETERMINE THE DYNAMICS OF DISPERSION AND DISSIPATION IN MARINE AND ESTUARINE WATERS AND THE EFFECTS ON MARINE AND ESTUARINE ORG**

STARTING/ COMPLETION DATE : 12/76 - 12/79 : FUNDING : ESTIMATED - FY77 / \$ 48633
 TASK CODE=Q625A-1-04 **EPA= ** (IN-HO) PRIOR FY76 / \$ 150000
 IN-HOUSE EFFORT : FY 77 / 00.0 YEARS ; TOTAL PROJECT 00.0
 EPA OFFICER.: EPA/ERL -GULF BREEZE
 INVESTIGATOR.: WP DAVIS US EPA
 D MIDDAGH US EPA
 A BADGER US EPA
 MILESTONES.... 07/76 -PUBLISH CONFERENCE "ENVIRONMENTAL IMPACT OF WATER SHLORINATION
 12/77 -CONTRIBUTE TO AND HOLD CONFERENCE ON HALOGENATION
 10/78 -PRELIMINARY ASSESSMENT OF HALOGENATION
 12/79 -FINAL ASSESSMENT OF IMPACT OF TREATMENT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... REC-003867 SSIE-ZMA 1108 TASK-Q625A-1-04 AP -625A
 DU -N140 LABT-HEE
 ABSTRACT..... IDENTIFICATION AND QUANTIFICATION OF HALOGENATED COMPOUNDS FORMED WHEN CHLORINE IS ADDED TO SEAWATER. INITIAL EMPHASIS WILL DESCRIBE THE INORGANIC AND ORGANIC REACTIONS WHICH LEAD TO LONG-LASTING BYPRODUCTS. FOLLOWUP STUDIES WILL INVESTIGATE THE COMPLEX AND PHYSICAL CHEMICAL FATE OF IDENTIFIED COMPOUNDS IN SIMULATED AND NATURAL MARINE ECOSYSTEMS, INCLUDING COMPLEXING WITH SEDIMENTS, OR UPTAKE AND BIOACCUMULATION BY ORGANISMS. ANALYTICAL CAPABILITY WILL BE APPLIED BOTH TO ON-SITE EXPERIMENT INVESTIGATIONS AND COMMUNITY STUDIES BY THE BEARS BLUFF FIELD STATION OF THE ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE.

****PROJECT: 03869-EFFECTS OF COMPOUNDS PRODUCED FROM PETROLEUM UTILIZATION ON MARINE
INVERTEBRATES WITH EMPHASIS ON NEOPLASIA AND CARCINOGENESIS**

STARTING/ COMPLETION DATE : 07/76 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 20000
TASK CODE=Q625A-1-06 **EPA-R804427-02 ** (GRANT) PRIOR FY76 / \$ 60440
EPA OFFICER.: JA COUCH EPA/ERL -GULF BREEZE SCH OF SCI/ATMOS SCI DEPT
INVESTIGATOR.: MC MIX OREGON STATE UNIV
MILESTONES...: 05/78 -FINAL REPORT
PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
ORDIS CODES...: REC-003869 SSIE-GMA 2792 1 EPA -R804427-02 TASK-Q625A-1-06
AP -625A DU -N140 LABT-HEE

ABSTRACT.....: OBJECTIVES: 1) TO DETERMINE THE CONCENTRATION (BODY BURDENS) OF SELECTED ENVIRONMENTAL CHEMICAL CARCINOGENS IN ECONOMICALLY-IMPORTANT MOLLUSKS AND CRUSTACEANS FROM OREGON BAYS, ESTUARIES AND INSHORE AREAS. 2) TO DETERMINE IF THERE IS A POTENTIAL PUBLIC HEALTH HAZARD TO MAN FROM CONSUMING SHELLFISH, HARVESTED FROM OREGON BAYS, ESTUARIES AND INSHORE AREAS, WHICH CONTAIN PETROLEUM BY-PRODUCTS THAT ARE CARCINOGENIC. 3) TO SURVEY POPULATIONS OF BIVALVE MOLLUSKS, DETERMINE THE INCIDENCE OF NEOPLASTIC DISEASES IN THESE POPULATIONS AND ASCERTAIN IF THERE IS ANY CORRELATION BETWEEN CARCINOGENIC BODY BURDENS AND THE INCIDENCES OF SUCH DISEASES. 4) TO IDENTIFY POINT SOURCES OF CHEMICAL CARCINOGENS THAT ARE PRESENT IN OREGON BAYS AND ESTUARIES UTILIZED IN THIS STUDY. 5) TO DETERMINE RATES OF CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBON UPTAKE AND ELIMINATION IN BIVALVE MOLLUSKS. EXTENSIVE PRELIMINARY INVESTIGATIONS HAVE BEEN CONDUCTED TO: DETERMINE WHICH OREGON BAYS WILL BE UTILIZED IN THE STUDY; ASCERTAIN WHICH SHELLFISH SPECIES WILL BE USED; LOCATE SITES AT WHICH SHELLFISH CAN BE CONTINUOUSLY SAMPLED. BIVALVE MOLLUSKS FROM DIFFERENT HABITATS IN THE VARIOUS BAYS ARE ANALYZED FOR THE PRESENCE AND AMOUNT OF BENZO(A)PYRENE (BAP) MONTHLY OR BI-MONTHLY. HISTOLOGICAL SECTIONS ARE PREPARED SO THAT DIAGNOSES CAN BE MADE AND NEOPLASTIC DISEASES, IF PRESENT, CAN BE IDENTIFIED

****PROJECT: 03870-FOOD WEBS, POPULATIONS, AND PRODUCTIVITY IN A SOUTHEAST COASTAL MARINE MARSH**

STARTING/ COMPLETION DATE : 09/76 - 08/78 : FUNDING : ESTIMATED - FY77 / \$ 50000
TASK CODE=Q625A-1-07 **EPA-R804688-02 ** (GRANT) PRIOR FY76 / \$ 70000
EPA OFFICER.: WP DAVIS EPA/ERL -GULF BREEZE
INVESTIGATOR.: NA CHAMBERLAIN COLLEGE OF CHARLESTON
CK BIERNBAUM COLLEGE OF CHARLESTON
MILESTONES...: 08/78 -FINAL REPORT
PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
ORDIS CODES...: REC-003870 SSIE-GMA 4147 EPA -R804688-02 TASK-Q625A-1-07
AP -625A DU -N140 LABT-HEE

ABSTRACT.....: THE OBJECTIVE OF THIS STUDY IS TO ESTABLISH LIFE HISTORY AND ECOLOGICAL INFORMATION ABOUT SALT MARSH COMMUNITIES IN THE NORTH EDISTO ESTUARY, LEADENWAL MARSH. THIS SITE WAS CHOSEN BECAUSE OF ITS ISOLATION FROM EXCESSIVE INFLUENCE OF HUMAN ACTIVITIES. ADDITIONALLY THE SITE IS ADJACENT TO THE E.P.A. BEARS BLUFF FIELD STATION. THERE, STUDIES ON EFFECTS OF LOW LEVELS OF HALOGENATED POLLUTANTS UPON MIXED COMMUNITIES OF MARSH ORGANISMS ARE BEING DONE. STUDIES OF THE LIFE HISTORIES OF ORGANISMS ON THE OYSTER BEDS, MUD, AND MARSH GRASS HABITATS WILL SUPPLY VALUABLE BASELINE DATA ABOUT BREEDING CYCLES, ONTOGENY AND TROPHIC RELATIONSHIPS, THEREBY PROVIDING INSIGHT FOR THE ECOSYSTEM MODELS RUN AT AT BEARS BLUFF. THE BASIC STUDY PLAN COMBINES EXPERTISE IN MYCOLOGY, PLANT PHYSIOLOGY, PARASITOLOGY, GENETICS, INVERTEBRATE AND VERTEBRATE ZOOLOGY, AND ECOLOGY. THE SECOND YEAR OF THE STUDY WILL FOCUS MORE CLOSELY ON STUDIES ON PRODUCTIVITY AND TROPHIC RELATIONSHIPS AMONG THE MARSH ORGANISMS. UNDER CONSIDERATION (AMONG OTHER STUDIES) ARE HABITAT SELECTION AND TROPHIC RELATIONSHIPS OF: AMPHIPODS, FISHES, AND FISH LARVAE IN THE UPPER MARSH; INTERTIDAL AND SUBTIDAL BENTHIC CRUSTA

****PROJECT: 03871-AN INVESTIGATION OF THE ECOLOGICAL EFFECTS OF RESIDUAL OZONE TO SELECTED ESTUARINE SPECIES**

STARTING/ COMPLETION DATE : 08/76 - 08/78 : FUNDING : ESTIMATED - FY77 / \$ 50000
TASK CODE=Q625A-1-08 **EPA-R804683-02 ** (GRANT) PRIOR FY76 / \$ 80000
EPA OFFICER.: WP DAVIS EPA/ERL -GULF BREEZE
INVESTIGATOR.: DT BURTON PHIL ACADEMY OF NAT SCI
MILESTONES...: 08/78 -FINAL REPORT
PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
ORDIS CODES...: REC-003871 SSIE-GMA 3301 1 EPA -R804683-02 TASK-Q625A-1-08
AP -625A DU -N140 LABT-HEE

ABSTRACT.....: A COOPERATIVE EFFORT IS PROPOSED BETWEEN THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA AND THE UNIVERSITY OF MARYLAND TO STUDY THE ECOLOGICAL EFFECT OF RESIDUAL OZONE TO SELECTED ESTUARINE SPECIES. WE PROPOSE TO DETERMINE THE TOXICITY OF RESIDUAL OZONE, BOTH LETHAL AND SUBLETHAL EFFECTS, TO SELECTED COMMERCIAL AND/OR RECREATIONALLY IMPORTANT ESTUARINE FINFISH AND SHELLFISH SPECIES AND THEIR LIFE STAGES UNDER VARIOUS ENVIRONMENTAL CONDITIONS. WE WILL ALSO COMPARE THE TOXICOLOGICAL EFFECTS OF RESIDUAL OZONE TO THOSE OF RESIDUAL CHLORINE WHICH ARE BEING DETERMINED ON THE SAME SPECIES AND LIFE STAGES UNDER THE SAME EXPERIMENTAL REGIMES SET FORTH ABOVE. FINALLY, WE PROPOSE TO EVALUATE THE ENVIRONMENTAL ACCEPTABILITY OF OZONE AS AN ALTERNATIVE TO CHLORINE.

****PROJECT: 03872-DESIGN OF EXPERIMENTS, STATISTICAL ANALYSES, AND EVALUATION OF AQUATIC RESEARCH DATA**

STARTING/ COMPLETION DATE : 10/76 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 45675
 TASK CODE=Q625A-1-09 **EPA=R805007-01 ** (GRANT) PRIOR FY76 / \$ 33000
 EPA OFFICER.: WP DAVIS EPA/ERL -GULF BREEZE
 INVESTIGATOR.: RG DOMEY UNIV OF TEXAS SOUTH TEXAS MED SCH/BIOENGIN DEPT
 BA MAASKANT UNIV OF TEXAS SOUTH TEXAS MED SCH/BIOENGIN DEPT
 MILESTONES....: 10/78 - FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-003872 SSIE-GMA 3459 EPA -R805007-01 TASK-Q625A-1-09
 AP -625A DU -N140 LABT-HEE
 ABSTRACT.....: OBJECTIVES: CONSULTATION ON DESIGNS OF RESEARCH ANALYSIS OF AQUATIC RESEARCH DATA, INCLUDING EVALUATION AND INTERPRETATION OF RESEARCH RESULTS WHEN REQUIRED. APPROACH: THE APPROACH IS MATHEMATICAL/STATISTICAL ACCOMPANIED BY APPROPRIATE GRAPHIC REPRESENTATION. PROGRESS: CERTAIN PRELIMINARY PILOT STATISTICAL PROGRAMS HAVE BEEN TESTED AND THE RESULTS ARE ON FILE AT THE GULF BREEZE ENVIRONMENTAL RESEARCH LABORATORY, BEARS BLUFF FIELD STATION, P. O. BOX 368, JOHNS ISLAND, SOUTH CAROLINA. CURRENT PLANS: PROCEED, AS REQUIRED; DESIGNS OF EXPERIMENTS, FURTHER DEVELOPMENT OF STATISTICAL METHODS, DATA ANALYSIS, EVALUATION AND INTERPRETATION OF RESULTS, AS NEEDED.

****PROJECT: 03878-ENVIRONMENTAL EFFECTS OF OFFSHORE DRILLING AND OIL ON THE MARINE ENVIRONMENT**

STARTING/ COMPLETION DATE : 04/77 - 12/78 : FUNDING : ESTIMATED - FY77 / \$ 439988
 TASK CODE=Q625A-2-1 **EPA=D7-01134 ** (IAG) PRIOR FY /
 EPA OFFICER.: NL RICHARDS EPA/ERL -GULF BREEZE
 INVESTIGATOR.: N SCHUH US ODD NAVY
 MILESTONES....: 12/77 -COMPLETE FIELD TESTS, PHASE I
 05/78 -REPORT ON FIELD TESTS, PHASE I
 05/78 -START FIELD TESTS PHASE II
 12/78 -COMPLETE FIELD TESTS PHASE II
 12/79 -REPORT ON FIELD TESTS PHASE II
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-003878 SSIE-ZMA 1114 EPA -D7-01134 TASK-Q625A-2-1
 AP -625A DU -N140 LABT-HEE
 ABSTRACT.....: THE WORK TO BE FUNDED UNDER THIS IAG INCLUDES THE CONDUCT OF RESEARCH TO (1) DETERMINE THE ENVIRONMENTAL EFFECTS OF OFFSHORE OIL EXTRACTION, AND (2) ASSESS THE EFFECTS ON THE MARINE ENVIRONMENT OF BUNKER C FUEL DERIVED FROM SHALE OIL. IN ORDER TO SIMULATE THE CONDITIONS OF THE MARINE ENVIRONMENT, THE USE OF THE STAGE I OFFSHORE PLATFORM OWNED AND MAINTAINED BY THE NCSL, PANAMA CITY, FLORIDA, WILL BE R

****PROJECT: 03879-TOXICITY TO MARINE ORGANISMS OF PETROCHEMICALS & ENERGY RELATED ORGANIC SOLVENTS DERIVED FROM OFF-SHORE ACTIVITIES & OCEAN DUMPING (**

STARTING/ COMPLETION DATE : 10/76 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 20000
 TASK CODE=Q625A-2-2 **EPA= ** (IN-HO) PRIOR FY76 / \$ 100000
 IN-HOUSE EFFORT : FY 77 / OO.O YEARS : TOTAL PROJECT OO.O
 EPA OFFICER.: EPA/ERL -GULF BREEZE
 INVESTIGATOR.: NL RICHARDS US EPA
 S SCHIMMEL US EPA
 S TAGATZ US EPA
 MILESTONES....: 09/77 -PROGRESS REPORT
 10/78 -FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-003879 SSIE-ZMA 1113 TASK-Q625A-2-2 AP -625A
 DU -N140 LABT-HEE
 ABSTRACT.....: OFFSHORE PETROLEUM EXTRACTION MAY AFFECT MARINE ORGANISMS AND ECOSYSTEMS IN THE GULF OF MEXICO AND OTHER AREAS UNDERGOING INTENSIFIED PETROLEUM EXPLOITATION, EXTRACTION, AND TRANSPORTATION ACTIVITIES. THE RESEARCH OBJECTIVE IS TO ASSESS THE EFFECTS OF THESE EMISSIONS ON MARINE ORGANISMS AND COMMUNITIES. BIOASSAYS ON SINGLE SPECIES AND COMMUNITIES WILL BE CONTINUED ON SELECTED COMPONENTS OF DRILLING MUDS. WORK WILL BE INITIATED ON WHOLE DRILLING MUDS AND OTHER POLLUTANTS EMITTED FROM EXTRACTION ACTIVITIES SUCH AS CUTTING AND MAN-MOBILIZED PETROL

****PROJECT: 04038-ASSESSMENT OF IMPACTS OF MINING AND AIRBORNE POLLUTANTS ON FOREST, RANGE, AND RELATED FRESHWATER ECOSYSTEMS**

STARTING/ COMPLETION DATE : 00/75 - 00/79 : FUNDING : ESTIMATED - FY77 / \$ 513000
 TASK CODE=V625A-11 **EPA=D5-E764 ** (IAG) PRIOR FY76 / \$ 1395000
 EPA OFFICER.: CW HALL EPA/HDOTRS- OEMI
 INVESTIGATOR.: UNKNOWN USDA FOREST SERV
 MILESTONES....: 01/78 -SEAM ALERT DATABASE ANNOUNCEMENTS
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004038 SSIE-GMA 4682 EPA -D5-E764 TASK-V625A-11
 AP -625A DU -N140 LABT-EMI
 ABSTRACT.....: ASSESS QUALITY OF WATER IN WATER BODIES IN STRIP-MINED AREAS AS IT RELATES TO HABITAT FOR AQUATIC ORGANISMS AND WILDLIFE SPECIES ASSOCIATED WITH THESE WATER BODIES. ASSESS TECHNOLOGIES FOR REDEPOSITING AND STABILIZING MINE SPOILS TO INCLUDE IDENTIFICATION OF TECHNOLOGIES THAT WILL KEEP WATER QUALITY WITHIN ACCEPTABLE LIMITS FOR AQUATIC ORGANISMS AND ASSOCIATED WILDLIFE SPECIES. ASSESS EFFECTS OF MINING-RELATED TRANSPORTATION SYSTEMS ON WATER, AIR, SOIL, PLANT, ANIMAL, AND ESTHETIC RESOURCES. DEVELOP OPERATIONAL TECHNICAL INFORMATION SYSTEM FOR RECLAMATION OF LANDS AFFECTED BY MINING.

****PROJECT: 04039-REVEGETATION AND RECLAMATION OF LAND AREAS DISTURBED BY MAN
(ENVIRONMENTAL AND HEALTH)**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 330000
TASK CODE=V625A-24 **EPA=D7-E763 ** (IAG) PRIOR FY76 / \$ 789000

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
INVESTIGATOR.: OL BENNETT USDA AGRIC RES SERV
RF FOLLETT USDA AGRIC RES SERV
PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
ORDIS CODES... REC-004039 SSIE-GMA 4670 EPA -D7-E763 TASK-V625A-24
AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: A) TO DEVELOP RECLAMATION PLANNING INFORMATION, B) TO DETERMINE EFFECTS OF STRIP MINING AND RECLAMATION PROCESSES ON THE QUANTITY AND QUALITY OF WATER, C) TO UTILIZE RECLAIMED LAND FOR PRODUCTION OF SPECIALTY AND OTHER CROPS. APPROACH: GREENHOUSE, GROWTH-CHAMBER, AND FIELD EXPERIMENTS ARE CONDUCTED TO DETERMINE THE EFFECTS OF VARIOUS TREATMENTS AND PRACTICES. HYPOTHESES ARE TESTED USING FIELD PLOTS AND OTHER EXPERIMENTAL TECHNIQUES TO DETERMINE THE EFFECTS OF TREATMENTS AND PRACTICES SO THAT PLANNERS, MINE OPERATORS AND OTHERS CAN USE THIS INFORMATION AS NEEDED. CURRENT YEAR PLANS AND/OR PROGRESS: STUDIES ARE BEING CONDUCTED ON WEATHERING, LEACHING, AND OTHER CHANGES IN MINE SPOILS WITH TIME. GUIDANCE IS BEING DEVELOPED FOR ANALYZING AND ASSESSING SPOIL MATERIAL. MATHEMATICAL MODELS ARE BEING DEVELOPED TO HELP PREDICT THE EFFECTS OF STRIP MINING AND RECLAMATION PRACTICES ON THE QUALITY AND QUANTITY OF WATER LEAVING MINED AREAS. USE OF FERTILIZERS, AMENDMENTS, AND MANAGEMENT PRACTICES ARE BEING USED TO ESTABLISH AND GROW SPECIALTY AND OTHER CROPS; THE NUTRITIONAL QUALITY IS BEING DETERMINED.

****PROJECT: 04040-ESTABLISHMENT OF SEVERAL CROP ROTATIONS ON RESTORED SOILS AT A COAL
SURFACE MINE**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 30000
TASK CODE=V625A-26 **EPA=D7-E762 ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
INVESTIGATOR.: S HENNING IOWA STATE UNIV OF SCI & TECH AGRIC EXP STA/AGRIC ENG
PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
ORDIS CODES... REC-004040 SSIE-GMA 4665 EPA -D7-E762 TASK-V625A-26
AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: INITIATE SYSTEMS OF CROP ROTATIONS TO DETERMINE THEIR ADAPTATION TO RESTORED SOILS AT A COAL SURFACE MINE; DETERMINE THE YIELD AND ECONOMIC RETURN FROM EACH CROP AND CROP ROTATION SYSTEM. APPROACH: SIX CROP ROTATIONS WILL BE INITIATED: (1) CONTINUOUS CORN, (2) CORN-SOYBEAN, (3) CORN-OATS-MEADOW, (4) PERMANENT MEADOW (GRASS), (5) PERMANENT MEADOW (LEGUME), AND (6) WINTER WHEAT WITH A SOYBEAN DOUBLE CROP WHEN POSSIBLE. EACH CROP YEAR OF INDIVIDUAL ROTATIONS WILL APPEAR YEARLY. A SUBSOIL TILLAGE TREATMENT WILL BE CONDUCTED ON ONE-HALF OF ALL PLOTS. A COMPLETE BLOCK EXPERIMENTAL DESIGN WILL BE EMPLOYED AND ALL TREATMENTS WILL BE REPLICATED THREE TIMES. PLANT EMERGENCE, PLANT DENSITY AND YIELDS WILL BE MEASURED. ECONOMIC RETURNS WILL BE CALCULATED BY SUBTRACTING PRODUCTION COSTS FROM THE MARKET VALUE OF THE CROP. PLANT SAMPLES AND SOIL SAMPLES WILL BE OBTAINED YEARLY AND FERTILIZER RATES WILL BE ADJUSTED TO OBTAIN MAXIMUM OR NEAR-MAXIMUM YIELDS. CURRENT PLANS: PLOT LAYOUTS HAVE BEEN DRAWN AND WILL BE IMPLEMENTED IN THE SPRING OF 1978. PLOTS WILL BE PLACED FOLLOWING THE INSTALLATION OF AN INTERCEPT TILE DRAIN AND FINAL LAND LEVELING OPERATIONS.

****PROJECT: 04041-IDENTIFYING AND PREVENTING SULFUR-RELATED PROBLEMS IN SOILS CREATED IN
COAL MINING OPERATIONS**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 40000
TASK CODE=V625A-27 **EPA=D7-E762 ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
INVESTIGATOR.: DS FANNING UNIV OF MARYLAND AGRIC EXP STA
MILESTONES... 03/78 -METHODS RESEARCH COMPLETE
06/78 -PRESENT CLASSIFICATION PAPER AT ISSC
09/79 -EVALUATION OF WEATHERING

PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
ORDIS CODES... REC-004041 SSIE-GMA 4666 EPA -D7-E762 TASK-V625A-27
AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: 1. A) TECHNIQUES FOR MEASURING SULFUR IN COAL-RELATED ROCKS AND SOILS AND B) TO STUDY THE DISTRIBUTION AND KINDS OF SULFUR IN GEOLOGIC COLUMNS, SPOILS AND SOILS. 2. PLANNING FOR BURIAL OF SULFIDIC MATERIALS TO PREVENT ELEVATED ACIDITY PROBLEMS TO GROWING PLANTS AND IN DRAINAGE WATERS. STUDY ACIDITY FROM SULFUR OXIDATION. DEVELOP CORRECTIVE MINING SPECIFICATIONS. 3. IMPROVED CLASSIFICATION SCHEMES FOR SOILS IN COAL MINING OPERATIONS TO INCLUDE SPECIAL CLASSES FOR THOSE SOILS WITH SULFURIC HORIZONS AND OR SULFIDIC MATERIALS. APPROACH: 1. FUSION OF SOIL OR ROCK SAMPLE WITH LiBO2, Li2B4O7, OR Na2 CO3 PRIOR TO X-RAY ANALYSIS. EMPLOY X-RAY FLUORESCENCE TO DISTINGUISH SULPHATE S FROM SULFIDE S. DETERMINE X-RAY INTENSITY PER UNIT OF S IN AN UNFUSED SAMPLE AND MEASURE EFFECT OF ADDITIONS OF VARIOUS FORMS. DEVELOP ORGANOLEPTIC S TEST. APPLY TO MARYLAND SPOILS. 2. EXPERIMENTAL BURIAL OF SULFIDIC MATERIALS FOR 1 YEAR, THEN EVALUATE WEATHERING. STUDY WEATHERING IN SULFIDE-BEARING UNDISTURBED ROCKS AND SPOILS. 3. DESCRIBE AND DOCUMENT THE SOIL CHARACTERISTICS OF SULFIDIC AND SULFURIC HORIZONS CREATED BY MINING. DEVELOP CLASSIFICATION SCHEME FOR SUCH ACIDIC MINE SOILS UNDER USDA TAXONOMY OF SOILS. ATTEMPT AREAL MAP DELINEATION OF DESCRIBED MINE SOILS. CURRENT PLANS: METHODS RESEARCH WILL BE DONE IN FALL AND WINTER 1977-8. BURIAL EXPERIMENTS WILL BE SET OUT IN AUTUMN 1978. EVALUATIONS OF WEATHERING IN 1979. CLASSIFICATION OF MAN-MADE MINE SOILS WILL BE ON-GOING. A CLASSIFICATION PAPER WILL BE PREPARED FOR PRESENTATION AT THE INTERNATIONAL SOIL SCIENCE CONGRESS IN EDMONTON IN JUNE, 1978.

****PROJECT: 04042-SOIL PROFILE CHARACTERISTICS OF RESTORED SOILS AT A COAL SURFACE MINE**

708-15-13

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 40000
 TASK CODE=V625A-28 **EPA=D7-E762 ** (IAG) PRIOR FY /
 EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI IOWA STATE UNIV OF SCI & TECH AGRIC EXP STA/AGRIC ENG
 INVESTIGATOR.: W SCHOLTES
 MILESTONES....: 01/78 -COLLECT CORE SAMPLES
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004042 SSIE-GMA 4654 EPA -D7-E762 TASK-V625A-28
 AP -625A DU -N140 LABT-EMI
 ABSTRACT.....: DETERMINE SOIL PROFILE CHARACTERISTICS OF SOIL RESTORED AT A COAL SURFACE MINE AND DETERMINE CHANGES IN THE RESTORED SOIL PROFILE RESULTING FROM INITIAL TILLAGE AND CROPPING OPERATIONS. COLLECT SAMPLES (CORES) FOR DESCRIPTION OF RESTORED SOIL PROFILES AND DETERMINATION OF SELECTED PHYSICAL AND CHEMICAL PROPERTIES. THE PROJECT IS JUST UNDERWAY AND ONE TRANSECT OF 9 CORES HAS BEEN OBTAINED FOR INITIAL ANALYSES.

****PROJECT: 04043-DEEP TILLAGE STUDIES ON RECLAIMED LOESS AND GLACIAL TILL 708-15-11**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 27000
 TASK CODE=V625A-29 **EPA=D7-E762 ** (IAG) PRIOR FY /
 EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI IOWA STATE UNIV OF SCI & TECH AGRIC EXP STA/AGRIC ENG
 INVESTIGATOR.: CE ANDERSON
 MILESTONES....: 04/78 -BEGIN DEEP TILLAGE OPERATIONS
 06/78 -FIRST RAINFALL SIMULATOR RUNS
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004043 SSIE-GMA 4653 EPA -D7-E762 TASK-V625A-29
 AP -625A DU -N140 LABT-EMI
 ABSTRACT.....: OBJECTIVES: TO EVALUATE THE EFFECTIVENESS OF DEEP TILLAGE IN COMBATING THE PROBLEMS OF COMPACTION ON LOESS & GLACIAL TILL FOUND IN OVERBURDEN FROM SURFACE COAL MINING IN THE MIDWEST; TO COMPARE WATER INTAKE, EROSION RATES & CROP YIELD RESPONSE TO NORMAL CHISEL PLOWING AND 3 DIFFERENT DEEP TILLAGE PRACTICES APPLIED DURING THE FIRST YEAR AFTER RECLAMATION; TO EVALUATE EFFECT OF TIME ON RESPONSE TO DEEP TILLAGE; TO EVALUATE EFFECT OF FIELD SLOPE ON THE RESPONSE TO DEEP TILLAGE; TO EVALUATE THE EFFECT OF 2 DIFFERENT CROPS ON RESPONSE TO DEEP TILLAGE. APPROACH: PLOTS WILL BE ESTABLISHED ON RECLAIMED SPOIL AT THE IOWA COAL PROJECT DEMONSTRATION MINE. TILLAGE TREATMENTS WILL INCLUDE CONVENTIONAL CHISEL PLOWING, SUBSOILING TO 18" ONE-WAY, SUBSOILING TO 18" IN 2 PERPENDICULAR DIRECTIONS, AND SUBSOILING TO 30" ONE-WAY. TWO CROPS, CORN & GRASS-LEGUME MEADOW, WILL BE STUDIED & PLOT SLOPES OF 3-5% AND 10%. EACH TREATMENT COMBINATION WILL BE REPLICATED TWICE. A ROTATING BOOM RAINFALL SIMULATOR WILL BE USED TO APPLY CONTROLLED SIMULATED STORMS ON 3 DIFFERENT OCCASIONS EACH YEAR. MEASUREMENTS WILL BE MADE ON DEPTH, INTENSITY & DURATION OF SIMULATED RAINFALL & SURFACE RUNOFF, SEDIMENT DISCHARGE & CHANGES IN SOIL MOISTURE. SOIL PHYSICAL PROPERTIES & CROP YIELDS WILL BE MEASURED FOR EACH PLOT. CURRENT PLANS: BECAUSE OF THE UNUSUALLY WET FALL AT THE SITE, DEEP TILLAGE OPERATIONS WERE DELAYED UNTIL SPRING. RAINFALL SIMULATOR PLOT EQUIPMENT IS BEING ASSEMBLED AND IN THE SPRING 64 PLOTS WITH GRASS-LEGUME AND CORN WILL BE PLANTED. THE FIRST SIMULATOR RUNS ARE PLANNED FOR EARLY JUNE.

****PROJECT: 04045-ENVIRONMENTAL ASSESSMENT OF NORTHERN PUGET SOUND & THE STRAIT OF JUAN DE FUCA**

STARTING/ COMPLETION DATE : 09/75 - 09/80 : FUNDING : ESTIMATED - FY77 / \$ 963000
 TASK CODE=V625A-34 **EPA=D6-E693-EN ** (IAG) PRIOR FY76 / \$ 2069000
 EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: HS HARRIS US DDC NATL OCEANIC & ATMOSPHERIC ADMIN
 HS HARRIS SW WASH RES UNIT
 ER LONG US DDC NATL OCEANIC & ATMOSPHERIC ADMIN
 R KOPENSKI US DDC NATL OCEANIC & ATMOSPHERIC ADMIN
 MILESTONES....: 06/80 -FINAL REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004045 SSIE-GMA 4683 EPA -D6-E693-EN TASK-V625A-34
 AP -625A DU -N140 LABT-EMI
 ABSTRACT.....: THIS PROJECT IS DESIGNED TO PROVIDE THE ECOLOGICAL AND ENVIRONMENTAL DATA NECESSARY FOR MAKING MANAGEMENT DECISIONS CONCERNING REGIONAL PETROLEUM DEVELOPMENT, AND FOR ASSESSING THE POTENTIAL IMPACT OF PETROLEUM HYDROCARBONS UPON THE ECOSYSTEM. THE RESULTS OF THIS RESEARCH WILL BE IMMEDIATELY APPLICABLE TO DECISIONS ON THE LOCATION OF DEEPWATER PORTS, EXPANSION OF REFINERY CAPACITY AT EXISTING REFINERY SITES VERSUS THE CONSTRUCTION AT NEW SITES, AND THE REGULATION OF TANKER TRAFFIC IN THE STRAIT OF JUAN DE FUCA AND NORTHERN PUGET SOUND. INVESTIGATIONS ARE BASED UPON EXISTING ECOLOGICAL AND ENVIRONMENTAL DATA AND INCLUDE BOTH FIELD AND LABORATORY RESEARCH. PRIORITY IS GIVEN TO EVALUATION OF THE ECOLOGICAL FACTORS AT RISK FROM LARGE OIL SPILLS. SECONDARY PRIORITY IS GIVEN TO DETERMINATION OF THE EFFECTS OF CHRONIC OIL DISCHARGES ASSOCIATED WITH TRANSPORT, TRANSFER, AND PROCESSING OF OIL AND OIL PRODUCTS. OUTPUT PRODUCTS WILL INCLUDE: (1) A DETAILED CHARACTERIZATION OF THE MAJOR MARINE BIOLOGICAL POPULATIONS AT RISK, (2) A DESCRIPTION OF THE PHYSICAL AND CHEMICAL PROCESSES WHICH TRANSPORT PETROLEUM HYDROCARBONS THROUGH THE ECOSYSTEM, (3) A BASELINE OF THE PRESENT OCCURRENCE AND VARIABILITY OF PETROLEUM HYDROCARBONS IN THE MARINE ECOSYSTEM, AND (4) A STATE-OF-THE-ART OIL SPILL TRAJECTORY MODEL FOR NORTHERN PUGET SOUND AND THE STRAIT OF JUAN DE FUCA.

****PROJECT: 04047-ENVIRONMENTAL ASSESSMENT OF AN ACTIVE OIL FIELD IN THE NORTHWESTERN GULF OF MEXICO**

STARTING/ COMPLETION DATE : 09/75 - 09/80 : FUNDING : ESTIMATED - FY77 / \$ 665000
 TASK CODE=V625A-35 **EPA-D6-E693-ED ** (IAG) PRIOR FY76 / \$ 1611000
 EPA OFFICER.: CW HALL EPA/HQOTRS- DEMI
 INVESTIGATOR.: CW CAILLOUET US DOC NATL OCEANIC & ATMOSPHERIC ADMIN
 CW CAILLOUET US DOC
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004047 SSIE-GMA 4680 EPA -D6-E693-ED TASK-V625A-35
 AP -625A DU -N140 LABT-EMI
 ABSTRACT..... A DETAILED MULTI-YEAR ENVIRONMENTAL ASSESSMENT OF THE BUCCANEER OIL AND GAS FIELD WAS INITIATED IN APRIL 1976. THE BUCCANEER FIELD IS APPROXIMATELY 32 MILES SOUTH-SOUTHEAST OF GALVESTON, TEXAS, IS RELATIVELY ISOLATED FROM OTHER OIL AND GAS FIELDS AND HAS BEEN IN PRODUCTION FOR 17 YEARS. THE OBJECTIVES OF THE STUDY ARE: (1) TO IDENTIFY AND DOCUMENT THE EXTENT AND TYPES OF BIOLOGICAL, CHEMICAL AND PHYSICAL ALTERATIONS IN A MARINE ECOSYSTEM THAT ARE ASSOCIATED WITH THE DEVELOPMENT OF AND PRODUCTION OF DISCHARGES FROM AN OIL FIELD; (2) TO DETERMINE THE SPECIFIC POLLUTANTS, THEIR QUANTITY, AND EFFECTS ON THE VARIOUS COMPONENTS OF THE MARINE ECOSYSTEM; AND (3) TO DEVELOP CAPABILITIES TO DESCRIBE AND PREDICT FATE AND EFFECTS OF OIL FIELD DISCHARGE CONSTITUENTS IN MAJOR COMPONENTS OF THE MARINE ECOSYSTEM. THE PROJECT WILL USE HISTORICAL AND NEW DATA TO DESCRIBE AND QUANTIFY THE BIOLOGICAL, CHEMICAL, AND PHYSICAL CHARACTERISTICS AND THE TEMPORAL VARIATIONS OF THESE CHARACTERISTICS IN THE ENVIRONMENTS OF AN ACTIVE FIELD. IN THIS SECOND YEAR OF RESEARCH, AN INTENSIVE INVESTIGATION OF ENVIRONMENTAL AND ECOSYSTEM VARIABLES WITHIN THE OIL AND GAS FIELD IS BEING CONDUCTED, WITH A VIEW TOWARD COMPARISON BETWEEN PRODUCTION PLATFORMS FROM WHICH PRODUCTION BRINES AND OTHER EFFLUENTS ARE RELEASED AND SATELLITE PLATFORMS (WELL JACKETS) WITH NO EFFLUENTS. ACADEMIC INSTITUTIONS PARTICIPATING IN THE RESEARCH INCLUDE RICE UNIVERSITY AND UNIVERSITY OF HOUSTON WITH ONE PRIVATE FIRM, LGL, INC. OF BRYAN, TEXAS, ALSO HAVING A MAJOR RESEARCH ROLE.

****PROJECT: 04048-FIELD AND FILT/UNFILT FIELD EXPOSURE CHAMBER STUDIES OF THE EFFECTS OF COAL-FIRED POWER PLANT EMISSIONS ON CROP AND FOREST SPECIES**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 150000
 TASK CODE=V625A-40 **EPA-D6-E721-DD ** (IAG) PRIOR FY76 / \$ 363000
 EPA OFFICER.: CW HALL EPA/HQOTRS- DEMI
 INVESTIGATOR.: JC NOGGLE US TVA
 HC JONES US TVA
 NT LEE US TVA
 C MCDUFFIE US TVA
 MILESTONES... 07/78 -MAJOR REPORT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004048 SSIE-GMA 4674 EPA -D6-E721-DD TASK-V625A-40
 AP -625A DU -N140 LABT-EMI
 ABSTRACT..... THESE STUDIES ARE AIMED AT CHARACTERIZING UNDER FIELD CONDITIONS THE RELATIONSHIPS OF POLLUTION DOSE AND EFFECTS ON FOLIAR APPEARANCE, GROWTH, AND YIELD OF SELECTED CROP AND FOREST SPECIES (INCLUDING SOYBEANS, WHEAT, COTTON, AND VIRGINIA PINE). A FIELD STUDY HAS BEEN CONDUCTED DURING TWO GROWING SEASONS IN THE VICINITY OF A COAL-FIRED POWER PLANT. CONTROL CROPS WERE GROWN UTILIZING AN AIR-EXCLUSION SYSTEM THAT OPERATED WHEN AMBIENT SO2 CONCENTRATIONS EXCEEDED 0.1 PPM. FOLIAR APPEARANCE, GROWTH, AND YIELD OF CROPS EXPOSED TO AMBIENT AIR SO2 CONCENTRATIONS WERE COMPARED TO THE CONTROL CROPS. A MILESTONE REPORT TO EPA DISCUSSING THE SELECTION AND CHARACTERIZATION OF EXPERIMENTAL PLOTS AND TESTING OF THE AIR-EXCLUSION SYSTEM WILL BE AVAILABLE IN EARLY FY 1978.

****PROJECT: 04050-EFFECTS OF EMISSIONS FROM COAL-FIRED POWER PLANTS ON SOYBEANS AND OTHER CROPS OF ECONOMIC IMPORTANCE TO SOUTHEAST US (ABBREV)**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 45000
 TASK CODE=V625A-42 **EPA-D6-E721-DD ** (IAG) PRIOR FY76 / \$ 121000
 EPA OFFICER.: CW HALL EPA/HQOTRS- DEMI
 INVESTIGATOR.: JC NOGGLE US TVA
 HC JONES US TVA
 NT LEE US TVA
 C MCDUFFIE US TVA
 FP WEATHERFORD US TVA
 MILESTONES... 06/78 -REPORT ON EXPOSURE CHAMBER DESIGN
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004050 SSIE-GMA 2953 1 EPA -D6-E721-DD TASK-V625A-42
 AP -625A DU -N140 LABT-EMI
 ABSTRACT..... THE STUDIES INVOLVE ACUTE AND CHRONIC CONTROLLED EXPOSURE STUDIES OF THE EFFECTS OF SO2, NO2, O3, AND COMBINATIONS OF THESE POLLUTANTS ON THE GROWTH AND/OR YIELD OF SOYBEANS, COTTON, WHEAT, AND VIRGINIA PINE GROWN AND EXPOSED UNDER SEVERAL ENVIRONMENTAL REGIMES. RESPONSES MEASURED INCLUDE VISIBLE INJURY, GROWTH, YIELD, RESPIRATION, AND PHOTOSYNTHESIS. A MILESTONE REPORT TO EPA DESCRIBING THE DESIGN, CONSTRUCTION, AND TESTING OF AN EXPOSURE CHAMBER WILL BE AVAILABLE JUNE 197

****PROJECT: 04052-TRANSFER, FATE, AND EFFECTS OF SOX, NOX, AND ACID PRECIPITATION ON A TERRESTRIAL ECOSYSTEM REPRESENTATIVE OF THE TENNESSEE VALLEY**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 184000
 TASK CODE=V625A-43 **EPA-D6-E721-DO ** (IAG) PRIOR FY76 / \$ 430000

EPA OFFICER.: CW HALL EPA/HQOTRS- DEMI
 INVESTIGATOR.: JM KELLY US TVA
 HC JONES US TVA
 JC NOGGLE US TVA

MILESTONES.... 01/79 -REPORTS ON STUDY OBJECTIVES AND AREA ECOLOGY

PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS

ORDIS CODES... RECN-004052 SSIE-GMA 2952 1 EPA -D6-E721-DO TASK-V625A-43
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THESE STUDIES IS THE CHARACTERIZATION AND QUANTIFICATION OF THE TRANSFER, FATE, AND EFFECTS OF SOX, NOX, AND ACID PRECIPITATION OF FORESTED ECOSYSTEMS TYPICAL OF THE TENNESSEE VALLEY. FIELD STUDIES INCLUDE THE DEVELOPMENT OF SULFUR AND NITROGEN BUDGETS FOR FORESTED WATERSHEDS INCLUDING MEASUREMENTS OF WET AND DRY ATMOSPHERIC INPUT. INSTALLATION OF INSTRUMENTATION HAS BEEN COMPLETED AT ONE SITE AND IS PROGRESSING ON THE OTHER SITE. AN INTERNAL REPORT SUMMARIZING ACTIVITIES AND PROGRESS IN FY 1976 WAS PRODUCED DURING FY 1977. AN ACID RAIN SIMULATOR SYSTEM HAS BEEN DEVELOPED AND IS BEING UTILIZED TO EVALUATE PLANT AND SOIL RESPONSE TO VARIOUS PRECIPITATION PH LEVELS. A MILESTONE REPORT COVERING THE OBJECTIVES, FACILITIES, AND ECOLOGICAL CHARACTERISTICS OF THE STUDY AREAS WILL BE WRITTEN DURING THE CURRENT FISCAL YEAR AND SHOULD BE AVAILABLE DURING EARLY FY 1979.

****PROJECT: 04054-BENEFICIAL EFFECTS OF SO2 EMISSIONS FROM COAL-FIRED POWER PLANTS ON CROP AND FOREST SPECIES**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 44000
 TASK CODE=V625A-44 **EPA-D5-E721-DO ** (IAG) PRIOR FY76 / \$ 105000

EPA OFFICER.: CW HALL EPA/HQOTRS- DEMI
 INVESTIGATOR.: JC NOGGLE US TVA
 HC JONES US TVA

MILESTONES.... 04/78 -REPORTS ON TWO YEAR'S DATA

PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS

ORDIS CODES... RECN-004054 SSIE-GMA 2951 1 EPA -D5-E721-DO TASK-V625A-44
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... THIS STUDY INVOLVES THE EVALUATION OF ECONOMIC BENEFITS OF SULFUR DEPOSITION FROM THE ATMOSPHERE ON CROP AND FOREST SPECIES. A TECHNIQUE FOR MEASURING THE ACCUMULATION OF SULFUR BY PLANTS FROM THE ATMOSPHERE HAS BEEN DEVELOPED. THE METHOD IS DESCRIBED IN TVA INTERNAL REPORT I-AQ-77-9, APRIL, 1977. SULFUR STATUS, IN SOILS LOCATED AT DIFFERENT DISTANCES FROM A COAL-FIRED POWER PLANT, WAS DETERMINED TO ASSESS THE DEPOSITION OF SULFUR OVER A TWENTY-FIVE YEAR OPERATIONAL PERIOD OF THE POWER PLANT. A MILESTONE REPORT DISCUSSING TWO YEAR'S DATA WILL BE AVAILABLE APRIL 1978.

****PROJECT: 04056-FATE & EFFECTS OF ATMOSPHERIC EMISSIONS FROM COOLING SYSTEMS ON TERRESTRIAL HABITATS**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 67000
 TASK CODE=V625A-46 **EPA-D6-E721-DP ** (IAG) PRIOR FY76 / \$ 159000

EPA OFFICER.: CW HALL EPA/HQOTRS- DEMI
 INVESTIGATOR.: JM KELLY US TVA
 HC JONES US TVA
 D BAIRD US TVA

PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS

ORDIS CODES... RECN-004056 SSIE-GMA 2934 1 EPA -D6-E721-DP TASK-V625A-46
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... THIS INVESTIGATION IS AIMED AT IDENTIFYING AND CHARACTERIZING THE EFFECTS OF ATMOSPHERIC RELEASES FROM MECHANICAL AND NATURAL DRAFT COOLING TOWERS. FOUR VEGETATION STUDY PLOTS WERE ESTABLISHED 1 TO 9 KM IN THE PREVAILING DOWNWIND DIRECTION FROM THE MECHANICAL DRAFT COOLING TOWERS AT BROWNS FERRY NUCLEAR PLANT. MEASUREMENTS INCLUDE (1) WET AND DRY DEPOSITION OF TOXIC CHEMICALS, THEIR ACCUMULATION IN AND EFFECTS ON SOIL AND VEGETATION, (2) IMPACTS OF MOISTURE ON GROWTH AND/OR YIELD OF SELECTED CROP AND TIMBER SPECIES AND INCIDENCE OF DISEASE.

****PROJECT: 04058-ECOLOGICAL RECOVERY AFTER RECLAMATION OF TOXIC SPOILS LEFT BY COAL**

SURFACE MINING

STARTING/ COMPLETION DATE : 07/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 70000
 TASK CODE=V625A-47 **EPA=D7-E721-BDQ ** (IAG) PRIOR FY76 / \$ 167000

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: TG ZARGER US TVA
 JB MADDOX US TVA
 WM SEAWELL US TVA

MILESTONES....: 04/78 -COMPLETE SHRUB/TREE PLANTINGS
 06/78 -ENVIRONMENTAL BASELINE REPORT

PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004058 SSIE-GMA 2905 1 EPA -D7-E721-BDQ TASK-V625A-47
 AP -625A DU -N140 LABT-EMI

ABSTRACT.....: OBJECTIVE: TO DETERMINE THE RATE OF RECOVERY OF A DAMAGED ECOSYSTEM IN RESPONSE TO INTENSIVE
 REMEDIAL TREATMENT OF A PROBLEM SURFACE MINE. THE PROJECT INVOLVES A PROBLEM WATERSHED IN WHICH 162
 HA (400 ACRES) OF FORESTED LAND WERE DISTURBED BY COAL SURFACE MINING IN THE EARLY 1970'S.
 UNSUCCESSFUL RECLAMATION EFFORTS RESULTED IN ADVERSE ENVIRONMENTAL IMPACTS WITHIN A 28 SQ KM (10.8
 SQ MI) WATERSHED THAT INCLUDES A CITY WATER SUPPLY RESERVOIR. APPROACH AND PLANS: PROJECT
 OBJECTIVES ARE BEING ACCOMPLISHED BY APPLYING INTENSIVE REMEDIAL LAND TREATMENTS AND EVALUATING
 THEIR EFFECTIVENESS BY MEASURING THE DEGREE OF RECOVERY OF THE AFFECTED TERRESTRIAL AND AQUATIC
 ECOSYSTEMS. ENVIRONMENTAL DATA COLLECTED DURING THE PERIOD OF MINING AND EARLY RECLAMATION EFFORT
 PROVIDE INITIAL BASELINE. MONITORING (SOIL, VEGETATION, AND RECEIVING STREAM ECOLOGY) IS BEING
 CONDUCTED THROUGH TREATMENT AND WILL BE CONTINUED THEREAFTER ON A MORE LIMITED BASIS AS LONG AS
 SIGNIFICANT RECOVERY IS NOTED. TREATMENTS ARE NOW COMPLETE EXCEPT FOR LIMING OF A FEW REMAINING
 PHYTOTOXIC SPOIL AREAS AND THE PLANTING OF 44 HA (108 ACRES) TO WILDLIFE SHRUB AND FOREST TREE
 SEEDLINGS IN THE 1977-78 SEASON. AN ENVIRONMENTAL BASELINE REPORT WILL BE PUBLISHED IN JUNE 1978.

****PROJECT: 04060-INFORMATION SYSTEMS DEVELOPMENT**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 57000
 TASK CODE=V625A-48 **EPA=D8-E721-DR ** (IAG) PRIOR FY76 / \$ 136000

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: BG ISOM US TVA

MILESTONES....: 04/78 -REPORT
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004060 SSIE-GMA 4698 EPA -D8-E721-DR TASK-V625A-48
 AP -625A DU -N140 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS TASK IS TO DEVELOP THE CAPABILITY TO MEASURE AND EVALUATE EXISTING AND
 ANTICIPATED ENVIRONMENTAL IMPACTS OF ENERGY-RELATED TECHNOLOGIES ON IMPORTANT BIOTIC ASSEMBLAGES IN
 THE AQUATIC ENVIRONMENT. REPRESENTATIVE DATA SETS HAVE BEEN TESTED USING VARIOUS ANALYTICAL
 TECHNIQUES. THE TECHNIQUES USED INCLUDE CORRELATION, DISTANCE AND ASSOCIATION COEFFICIENT MATRICES,
 DIVERSITY INDICES, AND VARIOUS CLUSTER AND ORDINATION ANALYSES. TWO OTHER SHORT-TERM PROJECTS WERE
 UNDERTAKEN AS PART OF THIS TASK--A HIERARCHICAL DIVERSITY STUDY AND A SIMILARITY COEFFICIENT STUDY
 TO DETERMINE WHAT COEFFICIENT(S) SHOULD BE USED WHEN CLUSTERING BIOLOGICAL DATA FROM STREAM
 SURVEYS. SPECIES ASSOCIATIONS HAVE BEEN IDENTIFIED FOR ADDITIONAL LABORATORY AND FIELD STUDIES TO
 DETERMINE THEIR FUNCTIONAL ROLE IN THE ENVIRONMENT. THIS INFORMATION WILL SUBSEQUENTLY BE USED TO
 ADAPT OR CREATE STATISTICAL AND/OR ECOSYSTEM SIMULATION MODELS IN ORDER TO ACCOMPLISH THE STATED
 OBJECTIVE. A MILESTONE REPORT WILL BE ISSUED EARLY IN 1978.

****PROJECT: 04081-ACUTE THERMAL EFFECTS - AQUATIC INSECTS**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 79000
 TASK CODE=V625A-49 **EPA=D8-E721-DR ** (IAG) PRIOR FY76 / \$ 189000

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: KJ TENNESSEN US TVA

PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004061 SSIE-GMA 2939 1 EPA -D8-E721-DR TASK-V625A-49
 AP -625A DU -N140 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS TASK IS TO PROVIDE DATA ON THE ACUTE EFFECTS OF THERMAL PLUME ENTRAINMENT ON
 AQUATIC INSECTS IN RESPONSE TO THE CONCERN THAT IF DRIFTING INSECTS CANNOT SUCCESSFULLY NEGOTIATE
 PASSAGE THROUGH THERMAL PLUMES, THEIR POPULATIONS UPSTREAM AND DOWNSTREAM OF STEAM-ELECTRIC
 STATIONS WILL BE DEPLETED. SPECIES SELECTED FOR INITIAL EVALUATION ARE THE BURROWING MAYFLY,
 HEXAGENIA BILINEATA, AND THE CHIRONOMID MIDGES, CHIRONOMUS SP. AND COELOTANYPUS SP. FIELD STUDIES
 HAVE BEEN CONDUCTED AT TWO TVA STEAM PLANTS AND HAVE BEEN SUPPLEMENTED BY LABORATORY STUDIES.
 THERMAL TOLERANCE OF IMMATURE H. BILINEATA AND COELOTANYPUS SP. IS HIGH: SHOCKS AS HIGH AS DELTA T
 20 DEGREES CENTIGRADE FOR 6 H (ACCLIMATION TEMPERATURE 15 DEGREES CENTIGRADE) RESULTED IN LOW
 PERCENTAGE OF MORTALITY. THE UPPER TEMPERATURE LIMIT FOR DEVELOPMENT OF H. BILINEATA EGGS IS NEAR
 37 DEGREES CENTIGRADE (OPTIMUM RANGE IS FROM 31 TO 34 DEGREES CENTIGRADE). THE EGGS CAN WITHSTAND A
 DELTA T OF 10 DEGREES CENTIGRADE (IF AMBIENT IS 30 DEGREES CENTIGRADE FOR AT LEAST 15 MIN AND YIELD
 A HIGH PERCENTAGE OF HATCHING. H. BILINEATA NYMPHS IN THE THERMAL PLUME AREA NEAR A STEAM PLANT
 WERE LARGER THAN THOSE AT THE AMBIENT STATION THROUGHOUT THE SPRING OF 1977. HOWEVER, GROWTH AT THE
 AMBIENT STATION ACCELERATED DURING LATE SPRING AND ADULT EMERGENCE OCCURRED ALMOST SIMULTANEOUSLY
 AT THE TWO STATIONS.

****PROJECT: 04063-BIOCHEMICAL METHODOLOGY, AQUATIC THERMAL IMPACTS**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 53000
 TASK CODE=V625A-50 **EPA-DB-E721-DR ** (IAG) PRIOR FY76 / \$ 126000

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: SA MURRAY US TVA
 CG BURTON US TVA

PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004063 SSIE-GMA 2935 1 EPA -DB-E721-DR TASK-V625A-50
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... THE OBJECTIVES OF THIS RESEARCH ARE TO DEVELOP AND IMPLEMENT HEMATOLOGICAL METHODOLOGIES FOR FISH, DEFINE BASELINE HEMATOLOGICAL PARAMETERS UNDER FIELD AND LABORATORY CONDITIONS, AND QUANTIFY AND ISOLATE THERMAL STRESS EFFECTS ON HEMATOLOGY OF FISH UNDER FIELD AND LABORATORY CONDITIONS. THE METHODOLOGIES HAVE BEEN DOCUMENTED IN A TVA INTERNAL REPORT (I-WQ-77-3). THE EFFECTS OF DENSITY STRESS HAVE BEEN ISOLATED FOR BLOOD CELL MORPHOLOGY IN CATFISH AND GOLDFISH AS WELL AS FOR SOME BIOCHEMICAL PARAMETERS IN GOLDFISH BLOOD. THE GOLDFISH REPORTS ARE IN MANUSCRIPT FORM, WHEREAS THE CATFISH REPORT WILL BE COMPLETED IN THE EARLY PART OF 1978. DATA ARE CURRENTLY BEING PROCESSED FOR HEMATOLOGICAL PARAMETERS OF BLUEGILL TO ISOLATE PREDATOR-DENSITY STRESS EFFECTS AND FIELD BASELINES. EXPERIMENTS ARE PLANNED TO ISOLATE THERMAL STRESS EFFECTS ON FISH HEMATOLOGY UNDER LABORATORY CONDITIONS. FIELD DATA HAVE BEEN GATHERED AT A STEAM PLANT TO DEMONSTRATE THE EFFECTS OF A POWER PLANT ON HEMATOLOGY OF BLUEGILL. THESE DATA WILL BE ANALYZED IN 1978.

****PROJECT: 04065-BIOMONITORING, MOLLUSKS, AND OTHERS**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 63000
 TASK CODE=V625A-51 **EPA-DB-E721-DR ** (IAG) PRIOR FY76 / \$ 151000

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: BG ISOM US TVA
 C GOOCH US TVA
 LT NEILL US TVA

MILESTONES... 12/78 -MAJOR REPORT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004065 SSIE-GMA 2933 1 EPA -DB-E721-DR TASK-V625A-51
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THIS TASK IS TO QUANTIFY THE ROLE OF BIOACCUMULATION IN CYCLING OF TRACE ELEMENTS (SELECTED METALS AND RADIONUCLIDES) RELEASED TO AQUATIC ECOSYSTEMS BY ENERGY TECHNOLOGIES (COAL COMBUSTION AND NUCLEAR STEAM-ELECTRIC STATIONS). LABORATORY PROCEDURES HAVE BEEN INVESTIGATED AND ARE NOW ALMOST COMPLETE. STUDIES INCLUDED DRY WEIGHT-ASH WEIGHT DETERMINATIONS, WET DIGESTION, A TENTATIVE PROCEDURE FOR TREATING EXTRAPALLIAL FLUID SAMPLES, AND VARIOUS INSTRUMENTS INCLUDING ANODIC STRIPPING AND ATOMIC ABSORPTION. A MILESTONE REPORT IS BEING INITIATED FOR ISSUANCE IN 1978.

****PROJECT: 04067-EVALUATE WATER INTAKE, ZOOPLANKTON ENTRAINMENT**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 67000
 TASK CODE=V625A-52 **EPA-DB-E721-DR ** (IAG) PRIOR FY76 / \$ 161000

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: RD URBAN US TVA
 DL DYCUS US TVA

PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004067 SSIE-GMA 2940 1 EPA -DB-E721-DR TASK-V625A-52
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THE RESEARCH PROJECT IS TO DETERMINE THE BEST TYPE OF INTAKE DESIGN TO MITIGATE DELETERIOUS EFFECTS TO THE ZOOPLANKTON COMMUNITY OF A WATER BODY. TO ACCOMPLISH THIS GOAL, SEVERAL DIFFERENT TYPES OF INTAKE DESIGNS AND SITINGS OF THESE INTAKES WILL BE EVALUATED AS TO THE RATE OF ENTRAINMENT, THE PERCENTAGE OF THE COMMUNITY ENTRAINED, AND THE POSSIBLE EFFECTS OF THE ENTRAINMENT UPON THE COMMUNITY. THE RESULTS OF THIS RESEARCH WILL PERMIT A DESCRIPTION OF ZOOPLANKTON DISTRIBUTION IN RESPONSE TO NATURALLY OCCURRING PHENOMENA (E.G., CURRENTS, THERMAL STRATIFICATION, PRESSURE CHANGES INDUCED BY OBJECTS IN THE WATER COLUMN, ETC.) TO BE MADE. BY KNOWING THESE RESPONSES, CRITERIA CAN BE DEVELOPED FOR USE IN DESIGNING AND LOCATING INTAKES WHICH WILL MINIMIZE THE ENTRAINMENT OF ZOOPLANKTON. SPECIFIC STUDIES GENERALLY CONFORM TO THE FOLLOWING FORMAT. THE HORIZONTAL AND VERTICAL DISTRIBUTION OF THE ORGANISMS IN A WATER MASS UPSTREAM OF THE INTAKE, AT THE INTAKE, THE DOWNSTREAM OF THE INTAKE ZONE ARE DETERMINED (I.E., THE SAME WATER MASS). IN ADDITION, TEMPERATURE, CURRENT DIRECTION, AND CURRENT VELOCITY DATA FOR VARIOUS DEPTHS WILL BE COLLECTED. HYDROLOGICAL MODELS OF THE AREA AROUND THE INTAKE WILL BE USED TO INCREASE THE RESOLUTION OF THE BIOLOGICAL DATA. RESULTS OF THESE PRELIMINARY STUDIES ARE BEING DEVELOPED INTO A MILESTONE REPORT DUE FOR COMPLETION IN OCTOBER 1978. ENTRAINMENT EFFECTS (316B) STUDIES WERE INITIATED IN 1974 AT 11 TVA FOSSIL-FUELED STEAM-ELECTRIC STATIONS. DATA FROM THESE STUDIES HAVE BEEN USED AS GUIDES FOR SELECTING APPROPRIATE STUDY SITES, AND THESE DATA ARE SUMMARIZED IN A TVA REPORT. INTAKE EVALUATION WILL BE CONDUCTED AT VARIOUS TVA STEAM-ELECTRIC STATIONS.

****PROJECT: 04069-STRIP MINE DRAINAGE WATER QUALITY WITH EMPHASIS ON TOXIC SUBSTANCES**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 175000
 TASK CODE=V625A-53 **EPA=D5-E721-D5 ** (IAG) PRIOR FY76 / \$ 418000

EPA OFFICER.: CW HALL EPA/HDQTRS- OEMI
 INVESTIGATOR.: RJ RUANE US TVA
 DB COX US TVA
 RP BETSON US TVA
 JS CROSSMAN US TVA
 WC BARR US TVA

PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004069 SSIE-GMA 2936 1 EPA -D5-E721-D5 TASK-V625A-53
 AP -625A DU -N140 LABT-EMI

ABSTRACT.....: THE OBJECTIVES OF THIS PROJECT ARE TO (1) IDENTIFY THE OCCURRENCE AND SIGNIFICANCE OF TRACE METALS IN A STRIP MINED AREA; (2) CALIBRATE EXISTING REGIONALIZED HYDROLOGIC MODELS USING DATA FROM SURFACE MINED WATERSHEDS WITH SEVERAL TYPES OF RECLAMATION; (3) DEVELOP OR EXTEND NONPOINT SOURCE WATER QUALITY MODELS SO THAT THE NATURAL-AREA ENVIRONMENTAL LOADINGS OF IMPORTANT WATER QUALITY CONSTITUENTS CAN BE PREDICTED; (4) RELATE THE TRANSPORT OF SIGNIFICANT TRACE METALS AND OTHER IMPORTANT WATER QUALITY CONSTITUENTS TO THE HYDROLOGY OF SMALL STRIP MINED WATERSHEDS; (5) DEVELOP RELATIONSHIPS BETWEEN THE CHEMICAL COMPOSITION OF STRIP MINE OVERBURDEN AND THE DOWNSTREAM TRANSPORT OF IMPORTANT CONSTITUENTS OVER AND ABOVE THE NATURAL-AREA ENVIRONMENTAL LEVELS (6) RELATE THE TRANSPORT OF IMPORTANT CONSTITUENTS TO THE STRUCTURE AND FUNCTION OF BIOLOGICAL COMMUNITIES. THE GOAL OF THIS PROJECT IS TO DEMONSTRATE THE METHODOLOGIES FOR PREDICTING THE IMPACT ON DOWNSTREAM BIODIC COMMUNITIES, BASED UPON THE CHARACTERISTICS OF THE SITE TO BE MINED. SAMPLING PROGRAMS ARE CONTINUING ON SIX AREA-MINED (JAMESTOWN, TENNESSEE) AND SIX CONTOUR-MINED (NEW RIVER BASIN, TENNESSEE) SITES. STORM EVENT SAMPLING HAS BEEN UNDERWAY AT EIGHT OF THESE SITES DURING THE PAST YEAR. ONE YEAR OF MONTHLY BIOLOGICAL AND FISHERIES DATA HAS BEEN COLLECTED AT THE JAMESTOWN SITES. CORE DRILLS HAVE BEEN PERFORMED FOR OVERBURDEN ANALYSIS AT THREE LOCATIONS IN THE CONTOUR-MINED SITES AND FOUR LOCATIONS IN THE AREA-MINED SITES. A DAILY STREAMFLOW AND STORM HYDROGRAPH MODEL HAVE BEEN CALIBRATED FOR PROJECT USE AND AN ALGORITHM FOR SUSPENDED SEDIMENT PRODUCTION AND TRANSPORT HAS BEEN MODIFIED AND IS BEING TESTED. A SEDIMENTATION BASIN MODEL IS ALSO BEING EVALUATED.

****PROJECT: 04070-PRODUCTION OF ARTHROPOD PESTS AND VECTORS IN COAL STRIP MINE POOLS**

STARTING/ COMPLETION DATE : 09/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 31000
 TASK CODE=V625A-54 **EPA=D8-E721-DT ** (IAG) PRIOR FY76 / \$ 70000

EPA OFFICER.: CW HALL EPA/HDQTRS- OEMI
 INVESTIGATOR.: E PICKARD US TVA
 JC COONEY US TVA

PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004070 SSIE-GMA 2937 1 EPA -D8-E721-DT TASK-V625A-54
 AP -625A DU -N140 LABT-EMI

ABSTRACT.....: MONTHLY FIELD SURVEYS ARE BEING CONDUCTED TO QUALIFY AND QUANTIFY ARTHROPOD COMPOSITION IN STRIP MINE POOLS ACCORDING TO POND AGE CLASSIFICATION. PRIMARY CONSIDERATIONS ARE TO IDENTIFY AND QUANTIFY THE VECTOR AND NOXIOUS SPECIES OF ARTHROPODS PRESENT OR TO PREDICT THEIR APPEARANCE AND IMPORTANCE AS RELATED TO COAL STRIP MINING OPERATIONS AND SEASONAL CHANGES. SIX SPECIES REPRESENTING TWO GENERA OF MOSQUITOES HAVE BEEN COLLECTED FROM THE PONDS. A TOTAL OF 18 FAMILIES OF INSECTS HAVE BEEN COLLECTED BY AQUATIC DIP NET AND EKMAN DREDGE SAMPLING IN THE 9 STUDY POOLS. RESULTS FROM VEGETATION INVENTORIES HAVE SHOWN A PAUCITY OF PLANTS, BOTH IN SPECIES AND IN NUMBERS. TYPHA LATIFOLIA AND SCIRPUS CYPERINUS WERE THE DOMINANT PLANTS IN THE PONDS. THERE APPEARS TO BE NO SIGNIFICANT DIFFERENCE IN THE PH OF THE WATER AMONG THE STUDY P

****PROJECT: 04072-IMPROVING ESTIMATES OF SODIUM HAZARD OF COAL SURFACE-MINED OVERBURDEN**
 706-15-14

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 15000
 TASK CODE=V625A-70 **EPA=D7-E762 ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HDQTRS- OEMI
 INVESTIGATOR.: WA BERG COLORADO STATE UNIV AGRIC EXP STA

PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004072 SSIE-GMA 4642 EPA -D7-E762 TASK-V625A-70
 AP -625A DU -N140 LABT-EMI

ABSTRACT.....: TO DETERMINE THE CHANGE IN SODIUM HAZARD OF WESTERN SURFACE-MINED COAL OVERBURDEN UPON EXPOSURE TO THE ATMOSPHERE AND SUBSEQUENT WEATHERING. ALSO TO DETERMINE IF THE CHANGE IS GREAT ENOUGH TO APPRECIABLY INCREASE THE WATER PERMEABILITY OF THE OVERBURDEN. THREE SAMPLES OF FRESHLY EXPOSED OVERBURDEN FROM EACH OF FOUR SURFACE COAL MINES IN THE WESTERN STATES WILL BE EXPOSED TO FIVE DIFFERENT LABORATORY AND GREENHOUSE WEATHERING TREATMENTS AND SAMPLED PERIODICALLY. UNWEATHERED AND WEATHERED SAMPLES WILL BE ANALYZED FOR THE SODIUM HAZARD BY DETERMINING THE SODIUM ADSORPTION RATIO, THE EXCHANGEABLE SODIUM PERCENTAGE, AND WATER PERMEABILITY. FRESH OVERBURDEN SAMPLES HAVE BEEN COLLECTED FROM SURFACE COAL MINES IN NORTH DAKOTA, MONTANA, NEW MEXICO, AND COLORADO. THE SAMPLES ARE NOW BEING GROUND (15 JAN 78) AND PREPARED FOR THE WEATHERING TREATMENTS.

****PROJECT: 04073-MINE SOIL RESOURCES IN THE POWDER RIVER BASIN - CHARACTERIZATION,
EVALUATION AND POTENTIALS 706-15-18**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 50000
TASK CODE=V625A-71 **EPA-D7-E762 ** (IAG) PRIOR FY /
EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
INVESTIGATOR.: GA NIELSEN MONTANA STATE UNIV
DU DOLLHOFF MONTANA STATE UNIV
PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
ORDIS CODES.: RECN-004073 SSIE-GMA 4645 EPA -D7-E762 TASK-V625A-71
AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: (1) A SPECTRUM OF MINE SOILS FROM THE NORTHERN GREAT PLAINS COAL PROVINCE WITH VARYING CHEMICAL AND PHYSICAL PROPERTIES WILL BE IDENTIFIED AND CHARACTERIZED. (2) CRITERIA WILL BE DEVELOPED FOR EVALUATING THE POTENTIAL OF MINE SOILS FOR SELECTED LAND USES. APPROACH: (1) SPECIAL EMPHASIS WILL BE PLACED ON CHARACTERIZING SPECIAL PROPERTIES OF MINE SOILS SUCH AS HIGH ROCK FRAGMENT CONTENT, WEATHERABILITY OF ROCK FRAGMENTS, AND STRATIFICATIONS OF CONTRASTING TEXTURE. METHODS WILL ALSO BE DEVELOPED AND PROPOSED FOR MAPPING MINE SOILS AND FOR DESCRIBING MAPPING UNITS OF SOILS ON MINED LAND. MINE SOIL VARIABILITY WILL ALSO BE STUDIED. (2) CRITERIA FOR EVALUATING MINE SOIL POTENTIAL WILL BE SELECTED ON THE BASIS OF EXTENSIVE REVIEW OF EXISTING LITERATURE AND ADDITIONAL FIELD RESEARCH. PROGRESS: INITIAL FIELD WORK, SITE SELECTION, AND LITERATURE REVIEW WERE BEGUN IN THE FALL OF 1977.

****PROJECT: 04074-ESTABLISHMENT, COMPOSITION AND PRODUCTIVITY OF SPECIES ADAPTED TO AREAS
DISTURBED BY STRIP MINING 706-15-15**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 30000
TASK CODE=V625A-72 **EPA-D7-E762 ** (IAG) PRIOR FY /
EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
INVESTIGATOR.: L WIESNER MONTANA STATE UNIV
PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
ORDIS CODES.: RECN-004074 SSIE-GMA 4643 EPA -D7-E762 TASK-V625A-72
AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: 1) EVALUATE THE PRODUCTIVITY AND COMPOSITION CHANGE OF NATIVE SPECIES RECENTLY ESTABLISHED ON MINE SPOILS. 2) EVALUATE NATURALIZED SPECIES TO DETERMINE THEIR ESTABLISHMENT AND PRODUCTIVITY CHARACTERISTICS. 3) CONTINUE TO DEVELOP METHODS FOR OVERCOMING SEED DORMANCY OF SPECIES WHICH SHOW PROMISE FOR USE IN RECLAIMING MINE SPOILS. 4) EVALUATE THE BUILDUP OF A DORMANT SEED POPULATION ON RECLAIMED AREAS IN COMPARISON TO THAT PRESENT IN UNDISTURBED AREAS. APPROACHES: 1) RESEARCH PLOTS WHICH WERE ESTABLISHED IN 1976 WILL BE EVALUATED FOR SPECIES COMPOSITION AND PRODUCTIVITY. 2) FIELD PLANTING WILL BE MADE TO EVALUATE ESTABLISHMENT AND PRODUCTIVITY OF INTRODUCED SPECIES WHICH ARE PRESENTLY BEING GROWN FOR FORAGE PRODUCTION NEAR STRIP MINED AREAS. 3) METHODS FOR OVERCOMING SEED DORMANCY OF PROBLEM SPECIES WILL BE DEVELOPED. DORMANT SEEDS WILL BE SUBJECTED TO SUCH TREATMENTS AS SCARIFICATION, PRESOAKING, PRECHILLING, AND VARIOUS CHEMICALS AND PLANT HORMONES. 4) SOIL CORES WILL BE TAKEN FROM 5-YEAR-OLD STANDS ESTABLISHED ON MINE SPOILS AND FROM UNDISTURBED AREAS. CURRENT PLANS AND/OR PROGRESS: THIS PROJECT IS FUNDED OCT. 1977 THEREFORE OUR MAJOR EFFORT HAS BEEN IN PLANNING THE FIELD PLANTINGS AND CONDUCTING DORMANCY BREAKING STUDIES.

****PROJECT: 04075-FLEXIBLE CULTURAL PRACTICES FOR ESTABLISHMENT OF PERENNIAL AND ANNUAL
VEGETATION ON TOPSOILED STRIPMINES**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 45000
TASK CODE=V625A-73 **EPA-D7-E762 ** (IAG) PRIOR FY /
EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
INVESTIGATOR.: L WIESNER MONTANA STATE UNIV
PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
ORDIS CODES.: RECN-004075 SSIE-GMA 4714 EPA -D7-E762 TASK-V625A-73
AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: 1) TO ASSESS THE CAPABILITIES OF SEVERAL ANNUAL AND PERENNIAL CROP SERIES TO FUNCTION AS BARRIERS FOR THE TRAPPING AND RETENTION OF WINTER SNOWFALL. 2) TO DETERMINE IF SNOW RETENTION INCREASES SEEDLING ESTABLISHMENT AND SUBSEQUENT GROWTH OF A FORAGE MIXTURE. 3) UTILIZING ANNUAL NURSE CROPS, STUBBLE SEEDING TECHNIQUES AND FROST SEEDING TECHNIQUES, TO DETERMINE THEIR IMPACT ON THE SUCCESS OF PERENNIAL FORAGE SEEDINGS ON SPOILS MATERIALS. 4) GROWING A GREEN MANURE CROP ON STOCKPILED TOPSOIL TO DETERMINE IF A SIGNIFICANT DECREASE IN WEED SEED AND INCREASE IN NITROGEN CONTENT CAN BE MADE OVER UNCROPPED STOCKPILED TOPSOIL. APPROACH: 1) SEVERAL ANNUAL AND PERENNIAL GRASSES AND FORBS WILL BE PLANTED ON COAL MINE SPOILS TO BE EVALUATED FOR SNOW TRAPPING. 2) A SUCCESSFUL FORAGE MIXTURE WILL BE SEEDING BETWEEN THE BARRIERS TO DETERMINE VALUE OF BARRIERS. 3) DIFFERENT KINDS OF ANNUAL CROPS WILL BE EVALUATED ALONG WITH DIFFERENT CROPPING SYSTEMS AND SEEDING TECHNIQUES TO DETERMINE THEIR EFFECT ON ESTABLISHMENT OF NATIVE SPECIES AND SOIL EROSION. 4) SEVERAL GREEN MANURE CROPS WILL BE EVALUATED TO DETERMINE THEIR EFFECT ON ESTABLISHMENT OF NATIVE SPECIES AND CONTROL OF WEEDS. CURRENT PLANS AND/OR PROGRESS: THIS PROJECT WAS FUNDED IN OCT., 1977. THEREFORE, OUR MAJOR EFFORT HAS BEEN IN PLANNING FIELD PLANTING AND OBTAINING LAND.

****PROJECT: 04078-WATER HARVESTING PARAMETERS ON SALINE MEDIA UNDER ARID CONDITIONS**

706-15-17

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 30000
TASK CODE=V625A-74 **EPA=D7-E762 ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HQOTRS- DEMI AGRIC EXP STA/PLANT SCI DEPT
INVESTIGATOR.: CM MCKELL UTAH STATE UNIV
PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
ORDIS CODES...: RECN-004076 SSIE-GMA 4646 EPA -D7-E762 TASK-V625A-74
AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: 1. TO DETERMINE THE QUANTITY OF HARVESTED WATER AND SALT CONCENTRATION IN RELATION TO SURFACE STABILIZATION TREATMENTS. 2. TO DETERMINE THE RATIO OF CATCHMENT SLOPE AREA TO TERRACE PLANTING AREA FOR EFFECTIVE PLANT ESTABLISHMENT IN AN ARID REGION. 3. TO DETERMINE THE QUALITY OF HARVESTED WATER FROM A SALINE MEDIA SURFACE. 4. TO DETERMINE HYDROLOGIC CHARACTERISTICS OF PROCESSED OIL SHALE. APPROACH: A SERIES OF 1 X 2 M FIELD PLOTS ON A 1:4 SLOPE OF PROCESSED OIL SHALE WILL BE TREATED WITH VARIOUS SURFACE STABILIZERS. SUBSEQUENTLY THE PLOTS WILL RECEIVE SIMULATED RAINFALL TREATMENTS TYPICAL OF SUMMER SHORT-DURATION INTENSE RAINSTORMS. WATER QUANTITY AND QUALITY WILL BE MEASURED. CURRENT PLANS AND/OR PROGRESS: A SERIES OF THREE PHYSICAL MODELS OF AN OIL SHALE DISPOSAL PILE WILL BE CONSTRUCTED WITH A 2 METER 1:4 SLOPE CATCHMENT AREA AND A 1 METER WIDE PLANTING TERRACE AREA. THESE MODELS WILL BE INSTRUMENTED FOR MOISTURE AND SALINITY MEASUREMENT PLUS SURFACE RUNOFF AND LEACHATE. WATER AND SALT MOVEMENTS IN THE OIL SHALE MASS WILL BE MATHEMATICALLY MODELED.

****PROJECT: 04077-CHARACTERISTICS OF MINE LAND OVERBURDEN DUE TO SHORT-TERM WEATHERING**

706-15-8

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 60000
TASK CODE=V625A-75 **EPA=D7-E762-FN ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HQOTRS- DEMI
INVESTIGATOR.: CB ROTH PURDUE UNIV
WW MCFEE PURDUE UNIV
PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
ORDIS CODES...: RECN-004077 SSIE-GMA 4644 EPA -D7-E762-FN TASK-V625A-75
AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: (A) IDENTIFY OVERBURDEN STRATA WHOSE WEATHERING WOULD INFLUENCE MANAGEMENT OF RECLAIMED LANDS IN WESTERN INDIANA. CHARACTERIZE THEIR WEATHERING RATES AND TRENDS. (B) DETERMINE THE CHANGES THAT AFFECT PHYSICAL, CHEMICAL AND MINERALOGICAL PROPERTIES IMPORTANT TO PLANT GROWTH, HYDROLOGICAL CHARACTERISTICS OR PHYSICAL STABILITY. (C) RELATE WEATHERING TO CRITERIA USED TO EVALUATE MATERIALS FOR PLANT GROWTH POTENTIAL AND TO PROBLEMS OF STABILITY AND WATER MOVEMENT. APPROACH: SAMPLES WILL BE SELECTED FROM THE MORE IMPORTANT STRATA IN THE EASTERN EDGE OF THE ILLINOIS COAL BASIN, WITH EMPHASIS ON MATERIALS LIKELY TO BE IMPORTANT IN THE ROOT ZONE IN FUTURE RECLAIMED LANDS. A MEASURE OF CHEMICAL WEATHERING WILL BE OBTAINED FROM LEACHING. TRIPPLICATE SAMPLES IN COLUMNS WILL BE SUBJECTED TO THE EQUIVALENT OF THREE YEARS' PRECIPITATION APPLIED IN AMOUNTS EQUIVALENT TO A MONTH'S PRECIPITATION EACH WEEK (36 WEEKS). PHYSICAL PHENOMENA WILL BE EVALUATED BY SUBMITTING SAMPLES TO FREEZING-THAWING CYCLES AND WETTING-DRYING SAMPLES. PARTICLE SIZE DISTRIBUTION AND WET AGGREGATE STABILITY BOTH BEFORE AND AFTER TREATMENT WILL BE AN INDICATION OF PHYSICAL STABILITY. TENDENCY TO CRUMBLE AND SEAL, AND THE CHANGES IN WATER HOLDING CAPACITY. GREENHOUSE TRIALS WILL COMBINE PHYSICAL WEATHERING (CHANGES IN MOISTURE) WITH LEACHING (DUE TO PLANT WATERING) WITH BIOLOGICAL EFFECTS RELATED TO ROOT ACTIVITY AND ASSOCIATED RHIZOSPHERE ORGANISMS. THE EFFECT OF PLANT INDUCED WEATHERING WILL BE EVALUATED USING THE TECHNIQUE OF SPYRIDAKIS ET AL., (1967). CURRENT PROGRESS: WORK IS JUST BEGINNING ON INITIAL SAMPLES.

****PROJECT: 04078-DIRECT SEEDING OF COMMERCIAL FOREST TREES ON SURFACE MINE SOIL 706-15-7**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 20000
TASK CODE=V625A-76 **EPA=D7-E762-ES ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HQOTRS- DEMI AGRIC EXP STA/FORESTRY DEPT
INVESTIGATOR.: DH GRAVES UNIV OF KENTUCKY
MILESTONES...: 03/78 -INSTALL TEST PLOTS
10/79 -COMPLETION DATE
PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
ORDIS CODES...: RECN-004078 SSIE-GMA 4647 EPA -D7-E762-ES TASK-V625A-76
AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: 1. DETERMINE THE EFFECTS OF SITE FACTORS (ASPECT, SLOPE, SPOIL MOISTURE AND TEMPERATURE) ON THE ESTABLISHMENT OF COMMERCIAL FOREST SPECIES BY DIRECT SEEDING. 2. DETERMINE THE EFFECTS OF VARIOUS CULTURAL PRACTICES, SUCH AS BURNING, FERTILIZATION, MULCHING, AND MULTIPLE TREE SPECIES MIXTURES ON THE SUCCESS OF DIRECT SEEDING. 3. DETERMINE THE EFFECTS OF GRASS-LEGUME SEEDING MIXTURES ON THE ESTABLISHMENT OF COMMERCIAL FOREST SPECIES BY DIRECT SEEDING. APPROACH: INITIALLY, MAJOR EMPHASIS WILL BE PLACED ON THE IDENTIFICATION OF ATMOSPHERIC AND SOIL ENVIRONMENTAL FACTORS CRITICAL TO THE ESTABLISHMENT OF TREES ON SURFACE-MINE SPOIL BY DIRECT SEEDING. SMALL, CAREFULLY INSTRUMENTED PLOTS WILL BE EVALUATED TO IDENTIFY THOSE ENVIRONMENTAL FACTORS. LARGE PLOT PILOT STUDIES WILL BE ESTABLISHED LATER TO TEST THE PRACTICAL VALUES OF DIRECT SEEDING AS A SILVICULTURAL PROCEDURE ON SURFACE MINE SPOIL. CURRENT PLANS: THE PLANNING PHASE OF THE STUDY IS IN PROGRESS. THE INSTALLATION OF PLOTS IS PLANNED FOR MARCH, 1978. DATA COLLECTION WILL BEGIN ALMOST IMMEDIATELY AND WILL CONTINUE THROUGH THE FINAL EVALUATION PHASE.

****PROJECT: 04080-METHODOLOGY DEVELOPMENT AND APPLICATION FOR DETERMINING INSTREAM FLOW NEEDS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 250000
 TASK CODE=V625A-78 **EPA-D7-E685 ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: C STALNAKER U.S. DEPT. OF THE INTERIOR
 K BAYHA U.S. DEPT. OF THE INTERIOR
 BL LAMB U.S. DEPT. OF THE INTERIOR
 R MILHOUS U.S. DEPT. OF THE INTERIOR
 K BOVEE U.S. DEPT. OF THE INTERIOR
 R HYRA U.S. DEPT. OF THE INTERIOR

PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004080 SSIE-GMA 4769 EPA -D7-E685 TASK-V625A-78
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVE: DEVELOP IMPROVED METHODOLOGIES FOR DETERMINING THE INSTREAM FLOW REQUIREMENTS OF FISH, WILDLIFE, RECREATION AND AESTHETICS. APPROACH: DEVELOP, TEST AND EVALUATE METHODOLOGIES THROUGH AN INTERGOVERNMENTAL, MULTI-DISCIPLINARY TEAM. RELY HEAVILY ON EXISTING DATA AND REFINEMENTS TO EXISTING METHODS - PRIMARILY ENGINEERING AND BIOLOGICAL. CURRENT PLANS/PROGRESS: METHODOLOGIES CURRENTLY BEING TESTED, EVALUATED AND DOCUMENTATION PREPARED. PARTICULAR ATTENTION IS GIVEN TO PRIORITY NEEDS IN ARID WESTERN STATES WHERE ENERGY IMPACTS ON WATER RESOURCES ARE ANTICIPATED.

****PROJECT: 04079-EFFECTS OF COOLING TOWERS ON WEATHER**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=V625A-77 **EPA-D5-E681-CD ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: SR HANNA US DOE/OAK RIDGE LAB ATMOS TURB & DIF DIV
 RP HOSKER US DOE/OAK RIDGE LAB ATMOS TURB & DIF DIV

PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004079 SSIE-GMA 4766 EPA -D5-E681-CD TASK-V625A-77
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... THE OBJECTIVES OF THIS PROJECT ARE TO STUDY THE INFLUENCE OF COOLING TOWER GEOMETRY ON A PLUME AND TO DEVELOP AND TEST NUMERICAL CLOUD GROWTH MODEL FOR SINGLE COOLING TOWER PLUMES. A SMALL METEOROLOGICAL WIND TUNNEL WITH 1 SQUARE METER CROSS SECTION WILL BE INSTALLED AND TESTED, AND MULTIPLE PLUME INTERACTION STUDIES WILL BE DESIGNED. THE ATDL NUMERICAL CLOUD GROWTH MODEL WILL BE APPLIED TO COOLING TOWER PLUMES AT POWER PLANTS WHERE OBSERVATION PROGRAMS ARE CURRENTLY UNDERWAY. THE WIND TUNNEL HAS BEEN INSTALLED AND TESTED, AND STUDIES OF THE FLOW AROUND COOLING TOWERS INITIATED. THE NUMERICAL MODEL OF COOLING TOWER PLUMES AND CLOUD GROWTH WAS VALIDATED USING OBSERVATIONS AT THE ST. LOUIS WOOD RIVER REFINERY, THE LOS ANGELES REFINERIES, AND THE CHALK POINT, MD., POWER PLANT. DESCRIPTIONS OF THESE VALIDATION EXERCISES WERE PUBLISHED IN THE JOURNAL OF APPLIED METEOROLOGY, 15, 1232-1233; PROCEEDINGS OF THE 6TH AMS CONF. ON PLANNED AND INADVERTANT WEATHER MODIFICATIONS, 75-78; AND COOLING TOWER ENVIRONMENT-1978 (UN. MARYLAND), RESPECTIVELY.

****PROJECT: 04082-DETERMINE WATER QUANTITY NEEDS OF FISH IN WESTERN STATES AFFECTED BY ENERGY DEVELOPMENT**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 303000
 TASK CODE=V625A-79 **EPA-D7-E685 ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: JL BREITHAUP U.S. DEPT. OF THE INTERIOR
 A ANDREWS U.S. DEPT. OF THE INTERIOR
 H DDEKSEN U.S. DEPT. OF THE INTERIOR

PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004082 SSIE-GMA 4781 EPA -D7-E685 TASK-V625A-79
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: A. ESTABLISH INSTREAM FLOW REQUIREMENTS NECESSARY TO MAINTAIN THE VIABILITY OF SPECIES PRESENT IN HIGH PRIORITY WESTERN STATES' STREAMS; B. DEVELOP AND DOCUMENT METHODS, TECHNIQUES AND STRATEGIES FOR DETERMINING AND SECURING WATER QUANTITY NEEDS; TEST AND EVALUATE METHODS, TECHNIQUES AND STRATEGIES. APPROACH: USING IN-HOUSE AND CONTRACT RESEARCH AND DEMONSTRATION. CURRENT PLANS/PROGRESS: IDENTIFY PRIORITY STREAMS AND BEGIN FIELD STUDIES. PUBLISH REPORTS AS INFORMATION IS AVAILABLE. REPORTS TO INCLUDE DOCUMENTATION OF METHODS, FLOW REQUIREMENTS AND EVALUATIONS.

****PROJECT: 04084-ECOLOGICAL METHODS FOR RAPIDLY ASSESSING COAL DEVELOPMENT IMPACTS TO WILDLIFE HABITAT**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 700000
 TASK CODE=V625A-80 **EPA-D7-E685 ** (IAG) PRIOR FY /
 EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: RE STEWART U.S. DEPT. OF THE INTERIOR
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004084 SSIE-GMA 4774 EPA -D7-E685 TASK-V625A-80
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... SUMMARY: THESE INVESTIGATIONS IDENTIFY, DEMONSTRATE, AND IMPLEMENT A RAPID, COST EFFECTIVE, RELIABLE METHOD OF INVENTORYING AND CHARACTERIZING WILDLIFE HABITAT. WILDLIFE HABITAT IS BEING MAPPED USING MODERN PHOTOGRAPHIC AND SATELLITE TECHNIQUES FOR WESTERN COAL AREAS WITH HIGH DEVELOPMENT POTENTIAL. EMPHASIS IS BEING GIVEN TO STANDARDIZING BASE LINE STUDIES, HABITAT REQUIREMENTS OF WILDLIFE SPECIES FOR FOOD, COVER, BREEDING, AND OTHER CRITICAL FACTORS, AND TO THE RELATIONSHIP OF THESE FACTORS TO TERRESTRIAL ECOSYSTEMS, OTHER SURFACE RESOURCES AND EVENTS. EMPHASIS IS ALSO GIVEN TO A DETERMINATION OF HOW VARIOUS COAL RELATED ACTIVITIES, PARTICULARLY PROCESSING AND POPULATION GROWTH, IMPACT WILDLIFE AND THE MAGNITUDE OF THAT IMPACT. RESULTS WILL CONSIST OF MAPS, COMPUTER SYSTEMS, INTERIM AND FINAL REPORTS OF FIELD AND LABORATORY WORK AND AN INTERAGENCY WORKSHOP. STUDIES ARE BEING CONDUCTED ON WESTERN ECOLOGICAL TEST AREAS WHERE COAL DEVELOPMENT IS OR WILL BE TAKING PLACE. MAJOR MILESTONES: (1) TEST, EVALUATE, AND IMPLEMENT A COMPOSITE MAPPING AND ANALYSIS DATA SYSTEM; (2) TEST, EVALUATE AND PUBLISH THE APPLICABILITY AND COSTS OF DIFFERENT METHODS TO OBTAIN HABITAT, ECOSYSTEMS AND CULTURAL GEOGRAPHIC INFORMATION; (3) PUBLISH A PRELIMINARY ECOLOGICAL CLASSIFICATION OF SURFACE RESOURCES IN TEST AREAS; (4) DEVELOP A MULTIPLE-USE DECISION-ORIENTED ECOLOGICAL CHARACTERIZATION SCHEME; (5) PUBLISH DETAILED WILDLIFE MAPS OF ECOLOGICAL TEST AREAS; (6) PUBLISH FISH AND WILDLIFE DATA BASE REQUIREMENTS AND STANDARDS; (7) EVALUATE AND PUBLISH METHODS TO RAPIDLY MEASURE FISH AND WILDLIFE POPULATION PARAMETERS AND THEIR APPLICABILITY TO COAL DEVELOPMENT DECISIONS; AND (8) DEVELOP, IMPLEMENT AND DOCUMENT APPROACHES TO RAPIDLY MEASURING FISH AND WILDLIFE/HABITAT INTERRELATIONSHIPS.

****PROJECT: 04086-MAJOR COASTAL ECOSYSTEM CHARACTERIZATION AND METHODOLOGY WITH EMPHASIS ON FISH AND WILDLIFE AS RELATED TO OIL AND GAS DEVELOPMENT**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 600000
 TASK CODE=V625A-81 **EPA-D7-E685 ** (IAG) PRIOR FY /
 EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: H TAIT U.S. DEPT. OF THE INTERIOR
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004086 SSIE-GMA 4772 EPA -D7-E685 TASK-V625A-81
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: DEVELOP MULTI-YEAR PLAN FOR ECOLOGICAL CHARACTERIZATION OF COASTAL AREAS AND PREPARE STANDARDIZED METHODOLOGIES AND SPECIFICATIONS FOR CONDUCTING ECOLOGICAL CHARACTERIZATIONS. APPROACHES: DEVELOP PRIORITIES FOR RANKING CANDIDATE CHARACTERIZATION AREAS, A PROGRAMMATIC PLAN FOR COMPLETING ADDITIONAL CHARACTERIZATION STUDIES, AND A REPORT FOR THE REGIONALIZATION OF COASTAL ECOSYSTEMS. CURRENT PLANS: TO CHARACTERIZE FOUR SELECTED COASTAL ECOSYSTEMS (S.W. LOUISIANA, GEORGIA/SOUTH CAROLINA, MAINE, AND N.W. PACIFIC COAST) USING ABOVE METHODOLOGIES AND EVALUATE FACTORS WITH PREDICTIVE POTENTIAL.

****PROJECT: 04088-ECOLOGICAL AND PHYSIOLOGICAL/TOXICOLOGICAL EFFECTS OF OIL ON BIRDS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 440000
 TASK CODE=V625A-82 **EPA-D7-E685 ** (IAG) PRIOR FY /
 EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: LF STICKEL US DOI FISH & WILDLIFE SERV
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004088 SSIE-GMA 4773 EPA -D7-E685 TASK-V625A-82
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: TO EVALUATE THE EFFECTS ON BIRDS OF EXPOSURE TO PETROLEUM AND/OR COMPONENTS BY DIETARY INTAKE OR BY EXPOSURE OF EGGS. EFFECTS MEASURED INCLUDE PHYSIOLOGICAL FUNCTIONS, REPRODUCTIVE PERFORMANCE, SURVIVAL, AND TISSUE ACCUMULATION.

****PROJECT: 04090-INTERACTIONS OF HARDWOOD TREE SEEDLINGS AND HERBACEOUS COVER ON SURFACE MINED LAND**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 40000
 TASK CODE=V625A-83 **EPA=D7-E762 ** (IAG) PRIOR FY /
 EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI AGRIC EXP STA/ECOL DEPT
 INVESTIGATOR.: RJ HUTNIK PENNSYLVANIA STATE UNIV
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004090 SSIE-GMA 4777 EPA -D7-E762 TASK-V625A-83
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: (1) TO EVALUATE COMPATIBILITY OF VARIOUS HARDWOOD TREE SPECIES WITH HERBACEOUS COVER. (2) TO DEVELOP A SYSTEM OF REVEGETATING SURFACE MINED LAND WHICH WILL FURNISH BOTH IMMEDIATE SITE PROTECTION THROUGH RAPID ESTABLISHMENT OF HERBACEOUS COVER AND LONG-TERM PROTECTION PLUS A POTENTIALLY VALUABLE PRODUCT THROUGH ESTABLISHMENT OF HARDWOOD TREES. APPROACH: SEEDLINGS OR CUTTINGS OF FIVE HARDWOOD SPECIES (BLACK LOCUST, BLACK WALNUT, YELLOW POPLAR, HYBRID POPLAR, AND RED OAK) WILL BE PLANTED IN THE SPRING ON SURFACE MINED LAND RECLAIMED UNDER PRESENT STATE REGULATIONS AT THREE LOCATIONS IN THE BITUMINOUS REGION OF PENNSYLVANIA. PLANTING WILL BE DONE IMMEDIATELY AFTER SOWING OF RECOMMENDED MIXTURES OF GRASS AND LEGUME SEED. SEEDLINGS WILL ALSO BE PLANTED IN NARROW, NON-SEEDED STRIPS TO PERMIT EVALUATION OF HERBACEOUS COMPETITION ON TREE SEEDLING SURVIVAL AND GROWTH. SEEDLINGS OF BLACK LOCUST AND RED OAK WILL BE PLANTED IN THE SPRING ON REGRADED, RESOILED, LIMED AND FERTILIZED SURFACE MINED SITES IN CENTRAL PENNSYLVANIA. VARIOUS SPECIES MIXTURES OF GRASSES AND LEGUMES AT DIFFERENT RATES WILL BE SOWN JUST PRIOR TO PLANTING. SEEDLINGS WILL ALSO BE PLANTED IN HERBACEOUS COVER ESTABLISHED DURING THE PREVIOUS GROWING SEASON. CURRENT PLANS AND/OR PROGRESS. SITES ARE BEING SELECTED AND SEEDLINGS OBTAINED FOR PLANTING IN APRIL.

****PROJECT: 04091-UTILIZATION OF LEGUMES IN REVEGETATION OF ENVIRONMENTALLY STRESSED ARID MINE SPOILS**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=V625A-84 **EPA=D7-E762 ** (IAG) PRIOR FY /
 EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI AGRIC EXP STA/PLANT SCI DEPT
 INVESTIGATOR.: WF CAMPBELL UTAH STATE UNIV
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004091 SSIE-GMA 4780 EPA -D7-E762 TASK-V625A-84
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... A REPRESENTATIVE ARID AREA WESTERN COAL MINE WITH LARGE AREAS OF EXISTING AND PROJECTED MINE SPOILS, CLOSE TO LOGAN, UTAH AND ACCESSIBLE WITH VEHICLES AND OTHER EQUIPMENT WILL BE SELECTED. RHIZOBIUM STRAINS WILL BE ISOLATED FROM SELECTED HOST PLANT ASSOCIATIONS IN NEARBY, ENVIRONMENTALLY CLOSELY RELATED AREAS, AND EVALUATED ACCORDING TO THE FOLLOWING CRITERIA: 1) ABILITY TO COLONIZE THE HOST ROOTS RAPIDLY; 2) APPROPRIATE SPECIFICITY AND EFFECTIVENESS IN NITROGEN FIXATION WITH THE SELECTED HOST PLANTS; 3) SURVIVAL AND MULTIPLICATION CHARACTERISTICS; 4) ABILITY TO COMPETE WITH ANY NATURALLY OCCURRING RHIZOBIUM IN PRODUCING NODULES. NODULES WILL BE COLLECTED FROM THE NATIVE LEGUMES AND RHIZOBIUM STRAINS ISOLATED. SOIL SAMPLES IN THE STRIP-MINED OVERBURDEN AND UNDISTURBED CONTROL AREAS WILL BE COLLECTED AND EXAMINED FOR WILD RHIZOBIUM STRAINS. ISOLATED RHIZOBIUM WILL BE IDENTIFIED BY MEANS OF AN INFECTION TEST WITH THE RESPECTIVE HOST AND BY CULTURAL CHARACTERISTICS AND BIOCHEMICAL PROPERTIES. ISOLATES WILL BE MAINTAINED BY LYOPHILIZATION. SUITABLE RHIZOBIUM STRAINS WILL ALSO BE OBTAINED FROM EXISTING CULTURE COLLECTIONS AND TESTED WITH THE SELECTED LEGUMES FOR INFECTIVITY AND EFFECTIVITY OF N₂-FIXATION. WE WILL SURVEY AND SELECT SUITABLE SPECIES FROM THE LOCAL NATIVE LEGUMES SUCH AS EDIBLE LUPIN, HEDYSARUM BOREALE, LATHYRUS LANSZWERITII, VETCH AND NON-NATIVE MEDICAGO AND MELILOTUS SPP. CRESTED WHEATGRASS WILL BE USED WITH LEGUMES AS A NON-N₂ FIXING PLANT INDICATOR OF THE LEGUMES' EFFICIENCY IN SUPPLYING NITROGEN FOR ASSOCIATED PLANTS. THE INITIAL ASSESSMENT OF THE QUALITY OF GROWTH AND YIELD PATTERNS OF THE SELECTED LEGUMES WILL BE EVALUATED BY INOCULATING THE SEEDS WITH THE SPECIFIC ISOLATED AND SELECTED RHIZOBIUM STRAINS AND GROWN IN THE MINE-SPOIL SOILS IN GREENHOUSE STUDIES. PROMISING RESULTS FROM THE GREENHOUSE STUDIES WILL BE TRANSFERRED TO FIELD STUDIES. NUTRITIONAL DEFICIENCIES (EXCEPT P AND N) WILL BE CORRECTED ACCORDING TO SOIL ANALYSES AND RECOMMENDATIONS.

****PROJECT: 04092-ALDER FOR MINELAND RESTORATION IN COLD-DOMINATED CLIMATES**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 30000
 TASK CODE=V625A-85 **EPA=D7-E762 ** (IAG) PRIOR FY /
 EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: WW MITCHELL UNIVERSITY OF ALASKA
 JD MCKENDRICK UNIVERSITY OF ALASKA
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004092 SSIE-GMA 4775 EPA -D7-E762 TASK-V625A-85
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: THE PRINCIPAL OBJECTIVE OF THE STUDY INCLUDES MEANS OF EVALUATING THE CULTURAL PRACTICES AND USES OF ALNUS SP. (ALDER) IN REHABILITATING DRASTICALLY DISTURBED SITES SUCH AS COAL-MINE SPOILS. SPECIFIC OBJECTIVES INCLUDE 1) THE DETERMINATION OF SEED AVAILABILITIES OF ALDER ON DISTURBED SITES, 2) THE EXAMINATION OF SOIL CONDITIONS FAVORABLE OR INHIBITORY TO ALDER ESTABLISHMENT, AND 3) THE DOCUMENTATION OF PHYSICAL AND CHEMICAL SOIL CHANGES OCCURRING AS THE RESULT OF ALDER INVASION. APPROACH: RESEARCH PLOTS WILL BE ESTABLISHED TO EVALUATE PHYSICAL AND CULTURAL ASPECTS OF ALDER ESTABLISHMENT ON TWO ALASKAN MINE SPOILS. STRATIFIED SEED WILL BE USED AS A SEED SOURCE. GERMINATION AND GROWTH CHARACTERISTICS WILL BE MONITORED. IN ANOTHER STUDY, ALDER STANDS OF VARYING AGE WILL BE EVALUATED IN RELATION TO SOIL AND PLANT PROPERTIES, THUS DOCUMENTING BENEFICIAL CONTRIBUTIONS OF ALDER IN A COLD-DOMINATED CLIMATE. CURRENT PLANS AND/OR PROGRESS: THE STUDY IS IN ITS INITIAL YEAR OF ESTABLISHMENT. ALDER SEEDS HAVE BEEN COLLECTED AND GERMINATION REQUIREMENTS ARE BEING ASSESSED.

****PROJECT: 04093-THE EFFECTS OF TOPSOIL DEPTH OVER SALINE-SODIC SPOILS ON THE PRODUCTIVITY OF NATIVE RANGE SPECIES**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 40000
 TASK CODE=V625A-86 **EPA-D7-E762 ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HDQTRS- OEMI
 INVESTIGATOR.: WL GOULD NEW MEXICO STATE UNIV AGRIC EXP STA/AGRON DEPT
 PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004093 SSIE-GMA 4778 EPA -D7-E762 TASK-V625A-86
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: DETERMINE THE OPTIMUM DEPTH OF TOPDRESSING MINE SPOILS FOR MAXIMUM PRODUCTION OF NATIVE RANGE PLANTS UNDER NATURAL RAINFALL CONDITIONS IN A SEMI-ARID CLIMATE; 2) EVALUATE THE EFFECT OF SOIL DEPTH ON UPWARD MIGRATION OF SALTS FROM THE UNDERLYING SPOIL; 3) EVALUATE THE EFFECT OF SOIL DEPTH ON ROOT GROWTH OF NATIVE PLANTS. APPROACH: GRADUALLY INCREASING DEPTHS OF SOIL FROM 0 TO 125 CM. WILL BE PLACED OVER SALINE-SODIC SPOILS TO FORM A "WEDGE-SHAPED" BLOCK WITH SURFACE DIMENSIONS OF ABOUT 15 BY 30 METERS. THIS AREA WILL BE SEEDED IN ROWS RUNNING IN THE DIRECTION OF INCREASING SOIL DEPTH TO THREE SPECIES OF NATIVE GRASSES AND ONE SPECIES OF SHRUB. THREE ROWS OF EACH GRASS SPECIES AND A SINGLE ROW OF SHRUBS WILL BE SEEDED IN EACH REPLICATION. FORAGE PRODUCTION WILL BE DETERMINED FROM THE CENTER ROW OF EACH GRASS SPECIES. THE SEEDED AREA WILL BE IRRIGATED DURING ONE SEASON TO GET GOOD PLANT ESTABLISHMENT. DURING THE SECOND SEASON IRRIGATION PLUS RAINFALL WILL EQUAL THE AVERAGE MONTHLY RAINFALL AMOUNTS. GRASS YIELDS WILL BE DETERMINED AT EACH 10 CM. INCREMENT OF SOIL DEPTH. SHRUB CANOPY VOLUME WILL BE DETERMINED. THE CHEMICAL CHARACTERISTICS OF THE SPOIL MATERIAL AND SOIL WILL BE DETERMINED BEFORE SEEDING, AND AT THE END OF THE GROWING SEASON EACH YEAR FOR FOUR OR MORE YEARS. CORE SAMPLES WILL BE OBTAINED TO DETERMINE THE BIOMASS AND ORIENTATION OF ROOTS IN THE VARIOUS DEPTHS OF SOIL OR SPOIL. PROGRESS: A TOPSOIL "WEDGE" HAS BEEN BUILT AND IS READY FOR SEEDING.

****PROJECT: 04094-EFFECT OF METALS IN MARINE ORGANISMS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=V625A-87 **EPA-D5-E772 ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HDQTRS- OEMI
 INVESTIGATOR.: BA FOWLER US HEW NATL INST OF HLTH /PHS
 DW ENGEL US DOC

MILESTONES... 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT

PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004094 SSIE-GMA 4778 EPA -D5-E772 TASK-V625A-87
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: THIS STUDY WAS UNDERTAKEN TO DETERMINE THE PHYSIOLOGICAL, BIOCHEMICAL, AND ULTRASTRUCTURAL EFFECTS OF CADMIUM AND COPPER ON TISSUES OF MARINE SHELLFISH IN COMPARISON WITH THOSE PREVIOUSLY OBSERVED IN MAMMALS. LARGE NUMBERS OF SHELLFISH WILL BE EXPOSED TO CADMIUM FOR SUBSEQUENT INCORPORATION OF PROTEIN BOUND CADMIUM INTO RAT DIETS FOR EVALUATION OF PHARMACOKINETIC AND TOXICOLOGICAL DIFFERENCES IN COMPARISON TO SIMILAR DOSES OF THESE METALS ADMINISTERED IN DRINKING WATER. APPROACH: THE STUDY TO DATE HAS INVOLVED EXPOSING OYSTERS TO LOW CONCENTRATIONS OF COPPER AND CADMIUM IN A FLOWING SEAWATER SYSTEM AND EVALUATING METAL UPTAKE BY PROTON INDUCED X-RAY EMISSION ANALYSIS (PIXEA) IN RELATION TO ULTRASTRUCTURAL/BIOCHEMICAL CHANGES IN THE SAME ANIMALS. PROGRESS: STUDIES WERE CONDUCTED ON OYSTERS EXPOSED TO FLOWING NATURAL SEAWATER CONTAINING COPPER AT 0.1 PPM AS COPPER CHLORIDE FOR 14 DAYS. SAMPLES WERE TAKEN AT 1, 3, 7 AND 14 DAYS. THE ACCUMULATED COPPER IN THE OYSTER GILL TISSUE SIGNIFICANTLY AFFECTED THE TISSUE RESPIRATION RATE BY THE 14TH DAY. THERE WAS A STEADY INCREASE IN THE RESPIRATION RATES AND COPPER CONCENTRATIONS OF THE TREATED OYSTER TISSUE RELATIVE TO THE CONTROL TISSUE FROM THE 1ST THROUGH THE 14TH DAY. COLUMNAR GILL EPITHELIAL CELLS FROM THESE ANIMALS EXAMINED BY ELECTRON MICROSCOPY WERE SWOLLEN, CONTAINED NUMEROUS CLEAR VESICLES AND DAMAGED MITOCHONDRIA. GILL TISSUE FROM OYSTERS SIMILARLY EXPOSED TO CADMIUM AT 0.1 PPM AS CADMIUM CHLORIDE DID NOT SHOW THESE EFFECTS, OSTENSIBLY DUE IN PART TO THE PRESENCE OF A LOW MOLECULAR WEIGHT CADMIUM-SPECIFIC BINDING PROTEIN WHICH WAS FOUND TO BE RICH IN DICARBOXYLIC AMINO ACIDS AND CADMIUM ADSORPTION TO MUCUS COVERING THE OYSTERS. PROGRESS TO DATE USING PIXEA FOR METAL ANALYSIS HAS CENTERED ON OPTIMIZING SAMPLE PREPARATION PROCEDURES, BEAM CURRENTS, AND DETECTABILITY LIMITS IN RELATION TO THE DIAMETER OF THE PROTON BEAM AND POTENTIAL VOLATIZATION OF ELEMENTS FROM BIOLOGICAL TISSUE SAMPLES. A NUMBER OF BASELINE PIXEA STUDIES INCLUDING MICRO-SCANS FOR THE INTRA-ORGAN DISTRIBUTION OF 16 ELEMENTS WERE PERFORMED DURING THE LAST YEAR. THESE DATA WILL BE SUBJECTED TO STATISTICAL ANALYSIS IN THE NEXT FEW MONTHS.

****PROJECT: 04096-IN VITRO METABOLISM OF XENOBIOTICS BY SELECTED MARINE SPECIES**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 70000
 TASK CODE=V625A-88 **EPA-D5-E772 ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HDQTRS- OEMI
 INVESTIGATOR.: JR BEND US HEW NATL INST OF HLTH /PHS
 MO JAMES US HEW NATL INST OF HLTH /PHS

MILESTONES... 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT

PLAN ID..... (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES... RECN-004096 SSIE-GMA 4743 EPA -D5-E772 TASK-V625A-88
 AP -625A DU -N140 LABT-EMI

ABSTRACT..... WE ARE INVESTIGATING THE BIOTRANSFORMATION OF FOREIGN ORGANIC COMPOUNDS IN HEPATIC AND EXTRAHEPATIC TISSUES OF VERTEBRATE AND INVERTEBRATE MARINE SPECIES FROM COASTAL MAINE AND FLORIDA. BOTH CYTOCHROME P-450-DEPENDENT MICROSOMAL MIXED-FUNCTION OXIDASES AND ALKENE- AND ARENE OXIDE-METABOLIZING ENZYMES (EPOXIDE HYDRASE AND GLUTATHIONE S-TRANSFERASES) ARE BEING CHARACTERIZED IN CONTROL FISH AND IN FISH PRE-EXPOSED TO ENVIRONMENTAL CONTAMINANTS SUCH AS POLYCYCLIC AROMATIC HYD

****PROJECT: 04098-CARCINOGENIC EFFECTS OF PETROLEUM HYDROCARBONS ON SELECTED MARINE AND ESTUARINE ORGANISMS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 29000
 TASK CODE=V625A-89 **EPA-D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: CW HALL EPA/HDOTRS- OEMI
 INVESTIGATOR.: SP FELTON UNIV OF WASHINGTON
 BS MILLER UNIV OF WASHINGTON SCH OF FISHERIES
 MILESTONES...: 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT SCH OF FISHERIES
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004098 SSIE-GMA 4765 EPA -D5-E772 TASK-V625A-89
 AP -625A DU -N140 LABT-EMI

ABSTRACT.....: OBJECTIVES: TO COMPARE INCIDENCE OF TUMORS, PARTICULARLY EPIDERMAL PAPILLOMAS, IN EXPOSURE AND CONTROL GROUPS OF SELECTED FLATFISH SPECIES IN RESPONSE TO EXPOSURE TO BENZO(A)PYRENE (BAP) AND/OR ITS ELECTROPHILIC DERIVATIVES AND TO QUALITATIVELY EXAMINE THE HISTOPATHOLOGY OF COMPARABLE TUMORS OCCURRING IN BOTH EXPOSURE AND CONTROL GROUPS. METHODS EMPLOYED: STATIC AND FLOWING SEA WATER SYSTEMS WITH AQUARIA AND SAND COATED WITH BAP. MONITORING OF BAP CONCENTRATIONS BY GAS CHROMATOGRAPHY, ASSAY OF ARYL HYDROCARBON HYDROXYLASE (AHH), EXAMINATION OF FISH TISSUE BY ROUTINE HISTOPATHOLOGICAL PROCEDURES. MAJOR FINDINGS AND PROPOSED COURSE: THE FIRST QUARTER EFFORTS HAVE BEEN DIRECTED TOWARDS DEVELOPING A SUITABLE EXPOSURE SYSTEM, OPTIMIZING AHH ASSAY CONDITIONS FOR FLATFISH, REFINING ANALYTICAL AND BIOPSY PROCEDURES FOR HISTOPATHOLOGICAL ASSESSMENT OF FISH TISSUES. THESE INITIAL GOALS ARE IN THE PROCESS OF COMPLETION; TREATMENT OF FISH IS EXPECTED TO BEGIN IN THE NEXT QUARTER.

****PROJECT: 04100-DEFINING AND DIAGNOSING ORPHAN LANDS FOR RECLAMATION AND LAND USE POTENTIAL**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 40000
 TASK CODE=V625A-90 **EPA-D7-E762-FM ** (IAG) PRIOR FY76 / \$ 80000
 EPA OFFICER.: CW HALL EPA/HDOTRS- OEMI
 INVESTIGATOR.: RM SMITH WEST VIRGINIA UNIV
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004100 SSIE-GMA 5368 EPA -D7-E762-FM TASK-V625A-90
 AP -625A DU -N140 LABT-EMI

ABSTRACT.....: OBJECTIVES: (1) IDENTIFY; (2) CLASSIFY BY IMPORTANT PROPERTIES; (3) PLAN FOR IMPROVEMENT; (4) TEST IMPROVEMENT MEASURES. PHYSICALLY, CHEMICALLY AND ECONOMICALLY. APPROACH AND PLANS: AFTER DETERMINING REQUIREMENTS OF FEDERAL AND STATE LAWS AND REGULATIONS, WE WILL CONSULT LOCAL PEOPLE IN NEIGHBORHOODS OF OUR COMPLETED OVERBURDEN STUDIES TO DETERMINE PRIORITIES AND METHODS FAVORED LOCALLY. WE WILL USE AVAILABLE OVERBURDEN AND MINESOIL INFORMATION PLUS OBSERVATIONS, DESCRIPTIONS, SAMPLES, AND LABORATORY MEASUREMENTS TO DETERMINE WHETHER MINESOILS INVOLVED CAN BE CLASSIFIED BY THE WEST VIRGINIA SYSTEM (AS DEFINED IN PROPOSED AMENDMENTS TO SOIL TAXONOMY, 1975) AND WHAT IDENTIFIABLE CLASSES INCLUDE MOST PROBLEMS IN EACH NEIGHBORHOOD. ON SELECTED SITES, RECOMMENDATIONS WILL BE DEVELOPED FOR IMPROVEMENT PRACTICES TO ASSURE A MAXIMUM OF THE MOST VALUABLE LAND FOR THE FUTURE. SIMPLE TRIALS WILL BE TESTED ON SITES SELECTED BY PROPERTIES TO REPRESENT IMPORTANT LANDS NEEDING IMPROVEMENT. PLANS FOR COMPLEX BUT ECONOMICALLY FAVORABLE IMPROVEMENT WILL BE DEVELOPED WHERE SIMPLE MEASURES ARE JUDGED INADEQUATE. ELIMINATION OF OFF-SITE DAMAGE AND ESTABLISHING A BASE FOR LONG-RANGE BENEFITS TO SOCIETY WILL GUIDE IMPROVEMENT DECISIONS.

****PROJECT: 04102-DETERMINING AND INTERPRETING MINESOIL PROPERTY VARIATIONS WITHIN MAPPABLE CLASSES**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 30000
 TASK CODE=V625A-91 **EPA-D7-E762-FM ** (IAG) PRIOR FY /
 EPA OFFICER.: CW HALL EPA/HDOTRS- OEMI
 INVESTIGATOR.: RM SMITH WEST VIRGINIA UNIV
 PLAN ID.....: (AP-625A)(DU-N140) EFFECTS OF ENERGY-RELATED POLL. ON ORGANISMS & ECOSYSTEMS
 ORDIS CODES...: RECN-004102 SSIE-GMA 5365 EPA -D7-E762-FM TASK-V625A-91
 AP -625A DU -N140 LABT-EMI

ABSTRACT.....: OBJECTIVES: (1) TO REFINE CHARACTERIZATION OF MINESOIL CLASSES FROM AVAILABLE SAMPLE; (2) TO DESCRIBE, SAMPLE AND CHARACTERIZE ADDITIONAL SELECTED PEDONS REPRESENTING IMPORTANT DEFINED CLASSES. APPROACH AND PLANS: THIS RESEARCH INVOLVES DETERMINING ACID-BASE ACCOUNTS AND SUCH EXTRACTABLE HEAVY METALS AS ALUMINUM, IRON, MANGANESE, ZINC AND CADMIUM ON MINESOIL PROFILE SAMPLES REPRESENTING PARTICULAR IDENTIFIED CLASSES (FAMILIES) OF SPOLENTS, AS DEFINED BY THE WEST VIRGINIA SYSTEM OF CLASSIFICATION OFFERED AS AN AMENDMENT TO SOIL TAXONOMY. MOST SAMPLES WILL BE SELECTED FROM LAYERS OF PROFILES THAT HAVE BEEN FULLY DESCRIBED AND PARTIALLY CHARACTERIZED BY OTHER MEASUREMENTS IN RECENTLY COMPLETED OR ON-GOING WORK. SUCH SAMPLES ARE AVAILABLE FROM THE CLASSIFICATION STUDY COMPLETED BY SENCINDIVER (PH.D. DISSERTATION, 1976) AS WELL AS FROM PRESENT STUDIES OF PLANT ROOTS, SOIL WATER PROPERTIES, AND COARSE FRAGMENTS BY GRADUATE STUDENTS, J.T. AMMONS AND ERIC PERRY. EXTRACTABLE PLANT NUTRIENT CONCENTRATIONS AND OTHER APPROPRIATE SPECIAL TESTS WILL ALSO BE APPLIED TO SELECTED MINESOIL SAMPLES ON WHICH SUCH DATA ARE INCOMPLETE. IN ADDITION, OTHER PROFILES WILL BE DESCRIBED, SAMPLED AND CHEMICALLY AND PHYSICALLY CHARACTERIZED WHEN SUCH INFORMATION APPEARS NEEDED TO COVER THE FULL RANGE OF IMPORTANT MINESOIL FAMILIES AND TO TEST FIELD VARIABILITY WITHIN MAPPING U

Transport and Fate

****PROJECT: 01922-AMBIENT HYDROCARBON AND OZONE MEASUREMENTS NEAR A REFINERY**

STARTING/ COMPLETION DATE : 07/77 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 79000
 TASK CODE=G625B-EA-01 **EPA-R805376-01 ** (GRANT) PRIOR FY76 / \$ 65000

EPA OFFICER.: JJ BUFALINI EPA/ESRL - RTP
 INVESTIGATOR.: H WESTBERG WASHINGTON STATE UNIV SCH OF ENG
 MW HILDREN WASHINGTON STATE UNIV SCH OF ENG

MILESTONES...: 03/79 -FINAL REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: RECN-001922 SSIE-GMA 3787 EPA -R805376-01 TASK-G625B-EA-01
 AP -625B DU -N140 LABT-ALW

ABSTRACT.....: THE PRIMARY OBJECTIVE OF THIS STUDY IS TO EXAMINE THE IMPACT OF A PETROLEUM REFINERY ON DOWNWIND AMBIENT AIR QUALITY. MONITORING THE PRODUCTION OF SECONDARY GASEOUS POLLUTANTS SUCH AS OZONE AND OTHER OXIDANTS IN THE PLUME IS AN IMPORTANT GOAL. BOTH GROUND AND AIRCRAFT MONITORING SYSTEMS WILL BE EMPLOYED TO RECORD CHEMICAL AND PHYSICAL CHANGES IN THE PLUME AS IT DISPERSES DOWNWIND OF THE REFINERY. DETAILED ANALYSES FOR HYDROCARBONS, THE OXIDES OF NITROGEN, OZONE, CARBON MONOXIDE, PAN AND SULFUR DIOXIDE WILL BE PERFORMED. THE FIELD PROGRAM WILL CONDUCTED DURING THE SUMMER OF 1977 NEAR A REFINERY THAT IS ISOLATED FROM OTHER MAJOR HYDROCARBON EMISSION SOURCES.

****PROJECT: 01928-KINETIC STUDY OF SIMULATED SO2, NOX, RH-POLLUTED ATMOSPHERES**

STARTING/ COMPLETION DATE : 01/76 - 12/78 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=G625B-EA-02 **EPA-R804348-02 ** (GRANT) PRIOR FY76 / \$ 50000

EPA OFFICER.: JJ BUFALINI EPA/ESRL - RTP
 INVESTIGATOR.: J CALVERT OHIO STATE UNIV MATH & PHYS SCI/CHEM DEPT

MILESTONES...: 12/78 -REPORT ON CHEMICAL KINETIC SO2 SUBMODEL
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: RECN-001926 SSIE-GMA 3529 1 EPA -R804348-02 TASK-G625B-EA-02
 AP -625B DU -N140 LABT-ALW

ABSTRACT.....: KINETIC AND MECHANISTIC STUDIES WILL BE MADE TO RECOGNIZE AND TO QUANTITATIVELY CHARACTERIZE THE SEVERAL REACTION PATHWAYS WHICH RESULT IN THE CHEMICAL TRANSFORMATION AND REMOVAL OF SO2, NO, AND NO2 IN THE POLLUTED ATMOSPHERE. IN ONE PHASE OF THE WORK THE SEEMINGLY IMPORTANT REACTIONS OF THE ALKYL PEROXY AND HYDROPEROXY RADICALS WITH SO2, NO, AND NO2 ARE BEING INVESTIGATED. KINETIC FLASH SPECTROSCOPY, STEADY STATE PHOTOCHEMICAL SYSTEMS, AND STUDIES IN FLOW SYSTEMS ARE EMPLOYED TO FOLLOW THE KINETICS OF THE SO2 REACTIONS. THE IDENTIFICATION AND KINETIC CHARACTERIZATION OF THE INITIAL REACTIVE PRODUCTS OF THESE REACTIONS WILL BE ATTEMPTED USING INFRARED, VISIBLE, ULTRAVIOLET SPECTROSCOPY, MASS SPECTROSCOPY, AND MORE CONVENTIONAL CHEMICAL METHODS. IN OTHER PHASES OF THIS WORK WE PLAN TO STUDY THE REACTION PATHWAYS WHICH INVOLVE THE REACTIONS OF THE ELECTRONICALLY EXCITED SO2 WITH ATMOSPHERIC COMPONENTS AND THE REACTIONS OF THE HO RADICAL WITH SO2, NO, NO2, AND OTHER ATMOSPHERIC POLLUTANTS OF SPECIAL INTEREST. THE MECHANISM AND KINETIC INFORMATION OBTAINED IN THE STUDY WILL BE APPLIED DIRECTLY TO THE DEVELOPMENT OF A MORE REALISTIC COMPUTER SIMULATION SCHEME FOR THE PREDICTION OF RATES OF SO2 AND NOX REMOVAL REACTIONS AND THE NATURE OF THE INITIAL "SULFATE" AND OTHER UNIDENTIFIED AND RECOGNIZED PRODUCTS OF THE SUNLIGHT-IRRADIATED, NOX, SO2, RH-POLLUTED ATMOSPHERES.

****PROJECT: 01927-DEVELOPMENT OF A MODEL OF SO2 OXIDATION IN SMOG**

STARTING/ COMPLETION DATE : 07/77 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=G625B-EA-04 **EPA-R805335-01 ** (GRANT) PRIOR FY76 / \$ 73000

EPA OFFICER.: JJ BUFALINI EPA/ESRL - RTP
 INVESTIGATOR.: DF MILLER BATTELLE MEMORIAL INST
 GM SVERDRUP BATTELLE MEMORIAL INST

MILESTONES...: 06/78 -FINAL REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: RECN-001927 SSIE-GMA 3769 EPA -R805335-01 TASK-G625B-EA-04
 AP -625B DU -N140 LABT-ALW

ABSTRACT.....: THE IMMEDIATE OBJECTIVE OF THIS STUDY IS TO PROVIDE A NEW AND MORE COMPREHENSIVE BODY OF DATA USEFUL IN EVALUATING CURRENT THEORIES FOR THE GAS-PHASE OXIDATION OF SO2 IN POLLUTED AIR. THE ULTIMATE GOAL OF THE PROGRAM IS TO DEVELOP AND VALIDATE A MODEL WHICH WILL BE USEFUL IN PREDICTING SO2 OXIDATION RATES FOR A VARIETY OF ATMOSPHERIC CONDITIONS, INCLUDING THOSE FOR PLUMES FROM COMBUSTION SOURCES, URBAN CORE SMOG AND URBAN PLUMES, AND LONG-RANGE TRANSPORT OF LARGE AIR MASSES. EXPERIMENTS OF SO2 OXIDATION WILL BE CONDUCTED WITH THREE SMOG SYSTEMS: PROPYLENE, A SURROGATE MIXTURE OF URBAN HYDROCARBONS, AND EARLY-MORNING AIR IN COLUMBUS, OHIO. COMPARATIVE DATA FROM THESE THREE SYSTEMS WILL BE USED TO ASSESS THE ADEQUACY OF EXISTING KINETIC MODELS FOR SO2 OXIDATION AND TO FORMULATE MORE UNIQUE MODELS WHERE NECESSARY.

****PROJECT: 01928-TRANSFORMATION AND TRANSPORT OF AIR POLLUTANTS**

STARTING/ COMPLETION DATE : 07/75 - 07/80 : FUNDING : ESTIMATED - FY77 / \$ 40000
 TASK CODE=G625B-EA-05 **EPA= ** (IN-HO) PRIOR FY /
 IN-HOUSE EFFORT : FY 77 / YEARS : TOTAL PROJECT 05.0
 EPA OFFICER.: WE WILSON EPA/ESRL - RTP ORD/ESRL
 INVESTIGATOR.: WE WILSON US EPA
 MILESTONES...: 09/76 -FINAL REPORT
 12/77 -FINAL REPORT
 09/78 -FINAL REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: RECN-001928 SSIE-ZMA 914 TASK-G625B-EA-05 AP -625B
 DU -N140 LABT-ALW
 ABSTRACT.....: OBJECTIVES: DETERMINE THE RATES OF FORMATION AND REMOVAL OF SECONDARY POLLUTANTS, SUCH AS, SULFATES, NITRATES, AND ORGANIC AEROSOLS, DURING TRANSPORT DISTANCES FROM TEN TO HUNDREDS OF KILOMETERS. DETERMINE WHICH PARAMETERS INFLUENCE THE RATES OF FORMATION AND REMOVAL, AND THEIR FREQUENCY OF OCCURRENCE. APPROACH: USE AIRCRAFT AT MOBILE GROUND UNITS TO MEASURE PERTINENT PARAMETERS IN PLUMES FROM POINT AND AREA SOURCES AND STAGNANT AIR MASSES (HAZY BLOBS). DETERMINE MASS FLOW RATES OF POLLUTANTS UNDER VARIOUS CONDITIONS AND INFER REACTION RATES AND MECHANISMS. CURRENT PLANS AND/OR PROGRESS: MEASUREMENTS WERE MADE IN COAL-FIRED POWER PLANT PLUMES AND URBAN PLUMES DURING THE SUMMER OF 1974, 1975, AND 1976, IN A HAZY BLOB IN AUGUST IN 1976, AND IN AN OIL-FIRED POWER PLANT PLUME IN FEBRUARY 1977. PRELIMINARY REPORTS HAVE BEEN MADE AT APCA AND ACS MEETINGS. THE USE OF SF6 TRACERS AND CONTINUOUS SULFATE INSTRUMENTS WILL BE TESTED IN SPRING 1977. IN FY78 AND LATER, MEASUREMENTS WILL BE MADE IN ADDITIONAL AREAS OF THE U.S. DATA ANALYSES AND INTERPRETATIONS ARE CONTINUING WITH DATA PRESENTATIONS PLANNED FOR RTP (JUNE OR JULY 1977), DUBROVNIK (SEPTEMBER 1977) AND A REGIONAL MEETING EARLY IN 1978. RATES OF CONVERSION OF SO2 TO SULFATE AND RATES OF REMOVAL OF SO2 HAVE BEEN MEASURED UNDER SUMMER CONDITIONS. BACKGROUND AIR COMPOSITION, BACKGROUND OZONE AND WATER VAPOR CONCENTRATIONS, AND EXTENT OF PLUME MIXING ARE PARAMETERS INFLUENCING REACTION RATES. CONVERSION IS OBSERVED BOTH DURING DAYLIGHT AND NIGHTTIME HOURS.

****PROJECT: 01929-SULFUR BUDGET IN LARGE PLUMES**

STARTING/ COMPLETION DATE : 04/77 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 247000
 TASK CODE=G625B-EA-06 **EPA=R803896-02 ** (GRANT) PRIOR FY76 / \$ 226000
 EPA OFFICER.: WE WILSON EPA/ESRL - RTP
 INVESTIGATOR.: RB HUSAR WASHINGTON UNIV
 NV GILLANI WASHINGTON UNIV
 JD HUSAR WASHINGTON UNIV
 MILESTONES...: 09/76 -FINAL REPORT
 12/77 -FINAL REPORT
 09/78 -FINAL REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: RECN-001929 SSIE-GMA 3768 EPA -R803896-02 TASK-G625B-EA-06
 AP -625B DU -N140 LABT-ALW
 ABSTRACT.....: THE OBJECTIVE OF THIS PROGRAM AS A PART OF PROJECT MISTT (MIDWEST INTERSTATE SULFUR TRANSFORMATION AND TRANSPORT) IS THE QUANTITATIVE DETERMINATION OF THE FATE OF ATMOSPHERIC SULFUR, I.E., THE RATE OF SULFATE FORMATION AND THE RATE OF SO2 REMOVAL TO THE GROUND. LARGE PLUMES EMITTED FROM THE ELEVATED (POWER PLANT) AND LOW LEVEL SOURCES (URBAN) WERE STUDIED ON THE REGIONAL SCALE. AIRBORNE MEASUREMENTS IN THE PLUMES AND BACKGROUND AIR OUTSIDE THE PLUME WERE CARRIED OUT FOR SO2 O3 NOX, BSCAT, AEROSOL CHARGE, PARTICULATE SULFUR CONCENTRATION AND SUPPORTED BY EXTENSIVE METEOROLOGICAL MEASUREMENTS. SULFUR BUDGETS OF WELL DEFINED PLUMES WERE ASSESSED. TRANSPORT OF POLLUTANTS IN PLUMES WAS CHARACTERIZED IN TERMS OF HORIZONTAL "LONG RANGE TRANSPORT" AND VERTICAL TRANSPORT. THE IMPORTANCE OF DRY REMOVAL FOR DIFFERENT TYPES OF PLUMES AND METEOROLOGICAL CONDITIONS WAS ASSESSED. SO2 TO PARTICULATE SULFATE CONVERSION RATES WERE DETERMINED FOR THE COAL-FIRED LABADIE POWER PLANT PLUME AND THE DIURNAL VARIABILITY (4 PERCENT PER HOUR FOR NOON HOURS AND 0.5 PERCENT PER HOUR FOR NIGHT HOURS) WAS DETERMINED.

****PROJECT: 01930-AIRCRAFT MEASUREMENTS IN SUPPORT OF PROJECT MISTT, MIDWEST INTERSTATE SULFUR TRANSFORMATION AND TRANSPORT**

STARTING/ COMPLETION DATE : 06/75 - 12/78 : FUNDING : ESTIMATED - FY77 / \$ 20000
 TASK CODE=G625B-EA-07 **EPA=68-02-2411 ** (CNTR.) PRIOR FY76 / \$ 269000
 EPA OFFICER.: - DURHAM EPA/ESRL - RTP
 INVESTIGATOR.: UNKNOWN METEOROLOGY RES INC
 MILESTONES...: 12/77 -FINAL REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: RECN-001930 SSIE-GMA 3021 1 EPA -68-02-2411 TASK-G625B-EA-07
 AP -625B DU -N140 LABT-ALW
 ABSTRACT.....: THE PURPOSE OF THE 1976 MISTT STUDY IS TO EXTEND THE RESULTS OF PREVIOUS STUDIES TO COVER LARGER DISTANCES FROM THE SOURCES AND OBTAIN MORE DETAILED KNOWLEDGE OF THE CHEMICAL PROCESSES OCCURRING IN POLLUTED AIR. THE AEROSOL FORMATION PROCESSES AS WELL AS GASEOUS PLUME CHEMISTRY WILL BE THE SUBJECT OF CONTINUED STUDY. CONVERSION RATES AND MECHANISMS IDENTIFIED EARLIER NEED TO BE VERIFIED UNDER A VARIETY OF METEOROLOGICAL CONDITIONS. THE AEROSOL CHEMISTRY OF THE URBAN AND POWER PLANTS PLUMES WILL BE EXAMINED USING NEW TECHNIQUES WHICH WILL YIELD INFORMATION ON SUBSTANCES OTHER THAN SULFATE. IN ADDITION TO REFINING OUR UNDERSTANDING OF THE CHEMICAL PROCESSES, THE 1976 PROGRAM WILL ATTEMPT TO BETTER DEFINE THE REGIONAL TRANSPORT AND ACCUMULATION MECHANISMS AT WORK IN THE EASTERN UNITED STATES. THE PROJECT WILL BE EXPANDED FROM THE IMMEDIATE ST. LOUIS AREA TO INCLUDE THE STUDY OF POLLUTANT ACCUMULATION AND TRANSPORT IN SYNOPTIC SCALE, SLOW MOVING, STABLE AIR MASSES.

****PROJECT: 01931 FORMATION OF ATMOSPHERIC AEROSOLS**

STARTING/ COMPLETION DATE : 07/75 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 225000
 TASK CODE=G625B-EA-08 **EPA-R803851-03 ** (GRANT) PRIOR FY76 / \$ 145000

EPA OFFICER : W WILSON EPA/ESRL - RTP
 INVESTIGATOR : KT WILBY UNIVERSITY OF MINNESOTA
 DR KITTELSON UNIVERSITY OF MINNESOTA
 RK CANTRELL UNIVERSITY OF MINNESOTA

MILESTONES... 09/76 -FINAL REPORT
 12/77 -FINAL REPORT
 09/78 -FINAL REPORT

PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001931 SSIE-GMA 3942 EPA -R803851-03 TASK-G625B-EA-08
 AP -625B DU -N140 LABT-ALW

ABSTRACT..... AEROSOL SIZE DISTRIBUTIONS HAVE BEEN MEASURED IN THE ST. LOUIS AREA AS PART OF EPA'S PROJECT MIST
 USING AIRCRAFT AND GROUND BASED SELF CONTAINED MOBILE LABORATORIES. THESE MEASUREMENTS WERE MADE
 WITH A GROUP OF COLLABORATORS SUCH THAT A COMPLETE ARRAY OF CHEMICAL, PHYSICAL, AND METEOROLOGICAL
 MEASUREMENTS WERE OBTAINED ON A COAL FIRED POWER PLANT PLUME. THE UNIVERSITY OF MINNESOTA'S PORTION
 OF THE PROJECT INCLUDED AEROSOL MEASUREMENTS ABOARD AN AIRCRAFT AND THE OPERATION OF A MOBILE VAN
 ON THE GROUND UNDER THE PLUMES. THIS MOBILE VAN WAS ALSO OPERATED ON FREEWAYS IN THE LOS ANGELES
 AREA DURING OCTOBER 1976 AS PART OF AN EPA SPONSORED PROJECT TO STUDY SULFUR AEROSOLS ON ROADWAYS.
 MUCH OF THE WORK DURING THE NEXT PROJECT YEAR WILL BE ANALYSIS AND REPORTING OF THE LARGE AMOUNT OF
 DATA OBTAINED DURING THE PAST SEVERAL YEARS. ANALYSIS IS BEING DIRECTED TOWARD OBTAINING AEROSOL
 GROWTH RATES IN THE PLUMES, AEROSOL NUCLEATION RATES IN THE PLUMES AND SURROUNDING ATMOSPHERE, AND
 TOWARD BETTER DESCRIPTIONS OF THE AEROSOL SIZE DISTRIBUTIONS. LABORATORY WORK TOWARD THE
 DEVELOPMENT OF A CONTINUOUS INSTRUMENT FOR THE MEASUREMENT OF AEROSOL SULFUR IS ALSO BEING
 PARTIALLY SUPPORTED BY THIS PROJECT.

****PROJECT: 01934-A STUDY OF THE IDENTITY AND SOURCES OF DENVER'S AEROSOLS**

STARTING/ COMPLETION DATE : 06/75 - 06/78 : FUNDING : ESTIMATED - FY77 / \$ 15000
 TASK CODE=G625B-EA-09 **EPA-R803078 ** (GRANT) PRIOR FY76 / \$ 20000

EPA OFFICER.: - DURHAM EPA/ESRL - RTP
 INVESTIGATOR.: RG DRAFTZ I I T RES INST
 JD STOCKHAM I I T RES INST
 J GRAF I I T RES INST

MILESTONES... 09/76 -FINAL REPORT
 12/77 -FINAL REPORT
 09/78 -FINAL REPORT

PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001934 SSIE-GMA 3773 EPA -R803078 TASK-G625B-EA-09
 AP -625B DU -N140 LABT-ALW

ABSTRACT..... THE CITY OF DENVER EXPERIENCES OVER 200 ATMOSPHERIC INVERSIONS EACH YEAR WHICH PRODUCE HAZE AND
 DECREASED VISIBILITY OVER SIGNIFICANT PORTIONS OF DENVER. IN 1973, THE U.S. EPA BEGAN A RESEARCH
 STUDY TO DETERMINE THE CAUSE AND SOURCES OF THIS POLLUTION PROBLEM. ONE IMPORTANT ASPECT OF THE
 STUDY INVOLVES THE IDENTIFICATION OF AEROSOLS COLLECTED FROM THE ATMOSPHERE. IN A PREVIOUS
 PRELIMINARY STUDY (1972), POLARIZED LIGHT MICROSCOPY WAS USED SUCCESSFULLY TO IDENTIFY MANY OF THE
 AEROSOL PARTICLES. THE GOAL OF THIS CURRENT PROPOSED STUDY IS TO TRACE THE SOURCES OF AEROSOL
 PARTICLES COLLECTED BY THE EPA AND OTHER AGENCIES AT A NETWORK OF SAMPLING STATIONS, BY IDENTIFYING
 THE TYPES OF PARTICLES AND COMPARING THEM TO REFERENCE SAMPLES. THE PARTICLES WILL BE CHARACTERIZED
 AND IDENTIFIED BY POLARIZED LIGHT MICROSCOPY SUPPLEMENTED WITH SCANNING ELECTRON MICROSCOPY AND
 MASS SPECTROMETRY. THE DATA FROM THESE ANALYSES WILL BE CORRELATED WITH METEOROLOGICAL AND AEROSOL
 DATA TO DISCOVER THE IMPACT OF INDIVIDUAL SOURCES IN PRODUCING HAZE.

****PROJECT: 01935-INTERPRETATION OF DATA FROM BIOGENIC SULFUR FIELD STUDIES/MIST
 TECHNICAL SUPPORT**

STARTING/ COMPLETION DATE : 04/77 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 34000
 TASK CODE=G625B-EA-13 **EPA-68-02-2500 ** (CNTR.) PRIOR FY76 / \$ 32000

EPA OFFICER.: - DURHAM EPA/ESRL - RTP
 INVESTIGATOR.: UNKNOWN ENV QUALITY RES INC

MILESTONES... 01/77 -PREPARE TECHNICAL SERVICE CONTRACT

PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001935 SSIE-GMA 3776 EPA -68-02-2500 TASK-G625B-EA-13
 AP -625B DU -N140 LABT-ALW

ABSTRACT..... DURING THE CONTRACT PERIOD THE CONTRACTOR WILL PROVIDE TECHNICAL SERVICES AS DIRECTED BY THE PROJECT
 OFFICER THROUGH TASK ORDERS. SUCH SERVICES WILL INCLUDE BUT ARE NOT LIMITED TO: 1) PREDICTION OF
 SIZE, SHAPE AND DIRECTION OF POWER PLANT AND URBAN PLUMES, 2) PLANNING ASSISTANCE (SITE SELECTION
 AND EXPERIMENTAL DESIGN), 3) SURFACE AND VERTICAL PROFILE MEASUREMENTS (PILOT BALLOONS,
 RADIOSONDES, HELICOPTER FLIGHTS, TOWER MEASUREMENTS), 4) MEASUREMENT OF VERTICAL FLUXES OF
 POLLUTANTS, 5) CALCULATION OF WIND FIELDS AND TRAJECTORIES, AND 6) PREPARATION OF APPROPRIATE DATA
 AND INTERPRETIVE REPORTS. THESE SERVICES ARE EXPECTED TO REQUIRE APPROXIMATELY 700 MAN-HOURS DURING
 THE CONTRACT PERIOD, BUT THE CONTRACT SHOULD PROVIDE FOR THE PURCHASE OF ADDITIONAL SERVICES IN
 INCREMENTS OF 235 MAN-HOURS IF THEY ARE NEEDED. THE CONTRACTOR SHALL PROVIDE EQUIPMENT, MATERIALS,
 AND TRAVEL THAT MAY BE REQUIRED TO

****PROJECT: 01938-MESOSCALE SULFUR BALANCE STUDIES**

STARTING/ COMPLETION DATE : 12/75 - 02/79 : FUNDING : ESTIMATED - FY77 / \$ 35000
 TASK CODE=G625B-EA-14 **EPA=R803887-02 ** (GRANT) PRIOR FY /

EPA OFFICER.: R PATTERSON EPA/ESRL - RTP
 INVESTIGATOR.: JW WINCHESTER FLORIDA STATE UNIV
 JW NELSON FLORIDA STATE UNIV ARTS & SCI/CHEM DEPT
 ARTS & SCI/CHEM DEPT

MILESTONES.... 12/78 -FINAL REPORT
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001936 SSIE-GMA 3952 EPA -R803887-02 TASK-G625B-EA-14
 AP -625B DU -N140 LABT-ALW

ABSTRACT..... A COMPREHENSIVE STUDY IS BEING CONDUCTED TO CHARACTERIZE THE OCCURRENCE OF SULFUR IN AEROSOL PARTICLES AT SAMPLING STATIONS IN 14 LOCATIONS BETWEEN THE MID-CONTINENT AND EASTERN SEABOARD OF CONTINENTAL U.S.A. ADDITIONAL REMOTE STATIONS IN MARINE AND CONTINENTAL AREAS ARE ALSO BEING OPERATED TO PROVIDE IMPORTANT BACKGROUND INFORMATION. EMPHASIS IS BEING PLACED ON THE CONCENTRATIONS OF SULFUR IN RELATION TO OTHER ELEMENTS PRESENT IN THE AEROSOL AND ON THE TIME VARIABILITY OF THESE CONCENTRATIONS WITH A TIME RESOLUTION OF 2 HOURS. SAMPLING IS BEING CARRIED OUT CONTINUOUSLY AT HEIGHTS FROM GROUND LEVEL TO 30 METERS BY A UNIQUE TIME SEQUENCE FILTER SAMPLER WHICH HAS BEEN DEVELOPED AT FLORIDA STATE UNIVERSITY. ADDITIONAL SAMPLES ARE PLANNED TO BE TAKEN DURING INTENSIVE PERIODS DURING THE YEAR BY CASCADE IMPACTORS AT ABOUT FIVE OF THE FILTER SAMPLING SITES, USING CASCADE IMPACTORS FOR DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION OF SULFUR AND RELATED ELEMENTS. ELEMENTAL ANALYSIS IS PERFORMED USING PROTON INDUCED X-RAY EMISSION, A HIGHLY SENSITIVE TECHNIQUE PERMITTING BOTH THE EXTREMELY SHORT 2-HOUR TIME RESOLUTION ON A CONTINUOUS BASIS FOR FILTER SAMPLES AS WELL AS THE SIZE RESOLUTION OF PARTICLES AS SMALL AS 0.25 MICRON DIAMETER BY CASCADE IMPACTORS. BY MEANS OF THE COMBINATION OF SAMPLING TECHNIQUES, THE IMPACT OF FOSSIL FUEL COMBUSTION AND OTHER ANTHROPOGENIC SOURCES OF SULFUR ON THE NATURAL CHARACTERISTICS OF THE ATMOSPHERE

****PROJECT: 01938-OPTICAL EFFECTS OF ATMOSPHERIC AEROSOL**

STARTING/ COMPLETION DATE : 10/75 - 12/78 : FUNDING : ESTIMATED - FY77 / \$ 25000
 TASK CODE=G625B-EA-15 **EPA=R800665-13 ** (GRANT) PRIOR FY76 / \$ 35000

EPA OFFICER.: II WILSON EPA/ESRL - RTP
 INVESTIGATOR.: AP WAGGONER UNIVERSITY OF WASHINGTON
 RJ CHARLSON UNIVERSITY OF WASHINGTON

MILESTONES.... 12/78 -FINAL REPORT
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001938 SSIE-GMA 4519 EPA -R800665-13 TASK-G625B-EA-15
 AP -625B DU -N140 LABT-ALW

ABSTRACT..... THIS IS ONE OF A MULTI-PART PROJECT WHOSE SUMMARY MAY BE IDENTICAL TO OTHERS. THIS CONTINUE OUR PAST STUDIES RELATING AEROSOL SOURCES, PHYSICAL AND CHEMICAL PROPERTIES OF THE PARTICLES, EFFECTS OF RELATIVE HUMIDITY TO ATMOSPHERIC OPTICAL PROPERTIES SUCH AS RADIATIVE CLIMATE AND VISIBILITY. INCLUDED WILL BE STUDIES OF THE RELATIONSHIPS OF PARTICLE PROPERTIES AND SYNOPTIC SCALE TRANSPORT.

****PROJECT: 01939-HALOCARBON ANALYSES IN THE ST. LOUIS, MISSOURI METROPOLITAN AREA**

STARTING/ COMPLETION DATE : 09/76 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 12000
 TASK CODE=G625B-EA-17 **EPA=68-02-2421 ** (CNTR.) PRIOR FY /

EPA OFFICER.: - ELLESTAD EPA/ESRL - RTP
 INVESTIGATOR.: RA RASMUSSEN WASHINGTON STATE UNIV SCH OF ENG

MILESTONES.... 09/78 -FINAL REPORT
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001939 SSIE-GMA 3369 1 EPA -68-02-2421 TASK-G625B-EA-17
 AP -625B DU -N140 LABT-ALW

ABSTRACT..... THE RESEARCH PROGRAM HAS TWO OBJECTIVES: 1) TO ANALYZE THE HALOCARBONS AND HYDROCARBONS IN AIR SAMPLES COLLECTED BY THE FIELD STUDIES IN THE ST. LOUIS AREA. PARTICULAR EMPHASIS WILL BE PLACED ON DETAILED C2 TO C12 HYDROCARBONS MEASUREMENTS FROM BOTH AIRCRAFT AND GROUND SAMPLING STATIONS. IN ADDITION, A COMPLETE ANALYSIS OF THE HALOCARBONS WILL BE ACCOMPLISHED, ESPECIALLY THE FLUOROCARBONS 11 AND 12 AND THE CHLOROCARBON CLEANING SOLVENTS. 2) TO PROVIDE FUTURE FIELD SUPPORT VIA AN INSTRUMENTED FIELD LABORATORY, METEOROLOGICAL SUPPORT FOR COORDINATING AIRCRAFT STUDIES AND INTERPRETING STAGNATING ANTICLONE WEATHER SITUATIONS. IN ADDITION, THE INSTALLATION OF SPECIALLY PROGRAMMED AUTOMATED HALOCARBON INSTRUMENTATION, AND/OR MANUALLY OPERATED HIGH-RESOLUTION HYDROCARBON INSTRUMENTATION IN GOVERNMENT-OWNED MOBILE AEROSOL LABORATORY WILL BE ACCOMPLISHED AT THE REQUEST OF THE GOVERNMENT.

****PROJECT: 01940-DEVELOPMENT & APPLICATION OF MULTIPLE TRACER TECHNIQUES FOR THE STUDY OF POLLUTANT TRANSPORT AND DISPERSION IN THE ATMOSPHERE**

STARTING/ COMPLETION DATE : 11/76 - 10/77 : FUNDING : ESTIMATED - FY77 / \$ 13500
 TASK CODE=G625B-EA-18 **EPA=R804990-01 ** (GRANT) PRIOR FY76 / \$ 54000

EPA OFFICER.: - SCHIERMEIER EPA/ESRL - RTP
 INVESTIGATOR.: FH SHAIR CALIFORNIA INST OF TECH DEPT OF CHEM & CHEM ENGIN

MILESTONES.... 09/77 -DATA REPORT
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001940 SSIE-GMA 3430 EPA -R804990-01 TASK-G625B-EA-18
 AP -625B DU -N140 LABT-ALW

ABSTRACT..... THIS IS A PROPOSAL REQUESTING SUPPORT FOR THE FURTHER DEVELOPMENT AND APPLICATION OF MULTIPLE ATMOSPHERIC TRACER TECHNIQUES. THE ANALYTICAL APPROACH IS TO EXTEND THE USE OF ELECTRON CAPTURE GAS CHROMATOGRAPHY. RECENTLY, WITH THE HELPFUL SUGGESTIONS GIVEN TO US BY RAY DIXON, WE HAVE DEVELOPED SYSTEMS WHICH SEPARATE SF6, CBRF3, CCL2F2, O2, AND CBR2F2 INTO SHARP DISTINCT PEAKS. THE LAST OF WHICH ELUTES WITHIN 200 SECONDS FROM THE TIME OF INJECTION. THE REST OF THE SYSTEM DEVELOPMENT IS TO DEVELOP THE CAPABILITY TO ACCURATELY ANALYZE AT LEAST 1000 AIR SAMPLES PER DAY. THE FIRST EXTENDED APPLICATION OF THIS MULTIPLE TRACER TECHNIQUE WOULD BE TO DETERMINE THE TRANSPORT AND EXTENT OF DISPERSION ASSOCIATED WITH: (1) URBAN SOURCES (EMITTED AT LOW LEVELS) AND (2) RURAL POWER PLANT PLUMES EMITTED AT HIGH LEVELS. SPECIFIC EXPERIMENTS ARE PLANNED TO ACCURATELY DETERMINE THE EXTENT OF VERTICAL DISPERSION ASSOCIATED WITH PLUMES TRAVELING OVER RURAL REGIONS AND OVER URBAN REGIONS.

****PROJECT: 01942-INTERNATIONAL SYMPOSIUM ON SULFUR IN THE ATMOSPHERE, DUBROVNIK, YUGOSLAVIA**

STARTING/ COMPLETION DATE : 03/77 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 43000
 TASK CODE=G625B-EA-19 **EPA=R805043-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: WE WILSON EPA/ESRL - RTP
 INVESTIGATOR.: RB HUSAR WASHINGTON UNIV
 JD HUSAR WASHINGTON UNIV

MILESTONES.... 03/78 -PUBLICATION OF PROCEEDINGS
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001942 SSIE-GMA 3771 EPA -R805043-01 TASK-G625B-EA-19
 AP -625B DU -N140 LABT-ALW

ABSTRACT..... THIS SYMPOSIUM SHOULD BRING TOGETHER AMERICAN, EUROPEAN AND OTHER PARTICIPANTS TO REPORT AND DISCUSS THE CURRENT ISSUES ON THE ATMOSPHERIC SULFUR PROBLEMS. IT IS ESTIMATED THAT THE GLOBAL EMISSION FROM ANTHROPOGENIC SOURCES ARE OF THE SAME ORDER OF MAGNITUDE AS EMISSION FROM NATURAL SOURCES. HOWEVER, MORE THAN 90% OF ANTHROPOGENIC SO₂ EMISSIONS ARE IN THE NORTHERN ATMOSPHERE. IT HAS BEEN RECOGNIZED THAT THE ANTHROPOGENIC SULFUR PROBLEM IS A REGIONAL ONE ON THE SPATIAL SCALE OF THOUSANDS OF KILOMETERS. THE HORIZONTAL AND VERTICAL DISPERSION MECHANISMS, REMOVAL RATES BY DRY AND WET DEPOSITION, SO₂ OXIDATION RATES AND MECHANISMS, THE PARTICULATE SULFUR SIZE DISTRIBUTION, SPATIO-TEMPORAL DISTRIBUTION AND CHEMISTRY OF AEROSOL SULFUR COMPOUNDS AND ASSOCIATED MEASUREMENT TECHNIQUES WILL BE DISCUSSED. THE SYMPOSIUM IS CO-SPONSORED BY UNITED NATIONS ENVIRONMENT PROGRAMME, ELECTRIC POWER RESEARCH INSTITUTE, U.S. ENVIRONMENTAL PROTECTION AGENCY, U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION, AMERICAN METEOROLOGICAL SOCIETY UNDER THE AUSPICES OF YUGOSLAV ACADEMY OF SCIENCES AND ARTS.

****PROJECT: 01943-DETERMINE THE CHARACTER AND ORIGIN OF AEROSOLS AND DEVELOPMENT OF FINE PARTICLE METHODOLOGIES**

STARTING/ COMPLETION DATE : 03/76 - 09/79 : FUNDING : ESTIMATED - FY77 / \$ 68000
 TASK CODE=G625B-EA-20 **EPA=68-02-2454 ** (CNTR.) PRIOR FY76 / \$ 45000

EPA OFFICER.: P PATTERSON EPA/ESRL - RTP
 INVESTIGATOR.: RE HEFFELFINGER BATTELLE MEMORIAL INST
 PW JONES BATTELLE MEMORIAL INST
 D MENDENHALL BATTELLE MEMORIAL INST
 D CHASE BATTELLE MEMORIAL INST

MILESTONES.... 06/78 -REPORT ON NON-URBAN AEROSOL COMPOSITION ESRL MODELER
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001943 SSIE-GMA 3125 1 EPA -68-02-2454 TASK-G625B-EA-20
 AP -625B DU -N140 LABT-ALW

ABSTRACT..... OBJECTIVES: THE OBJECTIVE OF THE PROJECT IS TO PROVIDE THE ANALYTICAL CHEMISTRY AND SMOG CHAMBER STUDIES SUPPORT NECESSARY TO DETERMINE THE CHARACTER AND ORIGIN OF AEROSOLS. APPROACH: THE APPROACH IS TO APPLY ALL INORGANIC AND ORGANIC ANALYSIS TECHNIQUES NECESSARY TO CHARACTERIZE AEROSOLS WITH REGARD TO ELEMENTS, IONS, AND COMPOUNDS. IN ADDITION SMOG CHAMBER STUDIES WILL BE CARRIED OUT IN ORDER TO ILLUCIDATE THE PROCESSES OF FORMATION OF AEROSOLS FROM GASEOUS PRODUCTS.

****PROJECT: 01945-STRUCTURE AND REACTIVITY OF ADSORBED OXIDES OF SULFUR**

STARTING/ COMPLETION DATE : 12/73 - 12/78 : FUNDING : ESTIMATED - FY77 / \$ 10000
 TASK CODE=G625B-EA-21 **EPA=R801136-06 ** (GRANT) PRIOR FY76 / \$ 10000

EPA OFFICER.: J DURHAM EPA/ESRL - RTP
 INVESTIGATOR.: JH LUNSFORD TEXAS A & M UNIV

MILESTONES.... 12/78 -FINAL REPORT
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001945 SSIE-AD 17607 4 EPA -R801136-06 TASK-G625B-EA-21
 AP -625B DU -N140 LABT-ALW

ABSTRACT..... OBJECTIVES: THE OVERALL OBJECTIVE OF THIS RESEARCH IS TO DETERMINE THE STRUCTURE AND REACTIVITY OF ABSORBED OXIDES OF SULFUR. RESULTS FROM SUCH A STUDY WILL BE USEFUL IN IDENTIFYING THE PHOTOCHEMICAL AND THERMAL REACTIONS WHICH TAKE PLACE ON ATMOSPHERIC AEROSOLS. THE SPECIFIC GOALS DURING THE CURRENT YEAR WERE (A) TO DEVELOP PHOTOELECTRON INFRARED SPECTROSCOPY AS A TECHNIQUE FOR STUDYING OXIDES OF SULFUR ON AEROSOLS, (B) TO DETERMINE THE MECHANISMS FOR THE OXIDATION OF SO₂ TO SO₄ ON SURFACES, (C) TO IDENTIFY IONS SUCH AS S₂O IONS AND H₂S ION WHICH MAY BE PRODUCED DURING THE PHOTOCHEMICAL REACTION OF H₂S WITH SO₂ ON MAGNESIUM OXIDE. EMPHASIS IN FUTURE WORK WILL BE PLACED ON THE CATALYTIC OXIDATION OF SO₂ IN FILMS OF ABSORBED WATER.

****PROJECT: 01946-REACTIONS OF SULFUR DIOXIDE IN AEROSOLS**

STARTING/ COMPLETION DATE : 08/76 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=G625B-EA-22 **EPA=R803814-02 ** (GRANT) PRIOR FY76 / \$ 20000

EPA OFFICER.: - DURHAM EPA/ESRL - RTP SCH OF ENG/CHEM ENG
 INVESTIGATOR.: DM HIMMELBLAU UNIV OF TEXAS

MILESTONES.... 06/78 - FINAL REPORT
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001946 SSIE-GMA 3578 2 EPA -R803814-02 TASK-G625B-EA-22
 AP -625B DU -N140 LABT-ALW

ABSTRACT..... THE OBJECTIVE OF THIS STUDY IS TO DETERMINE THE RATE AND EXTENT OF REACTION OF SULFUR DIOXIDE AND OTHER AIR POLLUTANTS AT PPM CONCENTRATIONS WITH AEROSOL DROPLETS OF THE ORDER OF SIZE OF ONE MICRON. IN THE INITIAL EXPERIMENTS RADIOACTIVE ³⁵SO₂ WILL BE TRANSFERRED TO AEROSOLS, AND THE TOTAL RADIOACTIVE SULFUR TRANSFERRED COUNTED. MODELS OF THE MASS TRANSFER AND REACTION WILL BE FIT BY THE EXPERIMENTAL DATA, AND USED TO ELUCIDATE THE EXTENT OF REACTION AND OXIDATION TO SULFATE.

****PROJECT: 01947-AEROSOL DEPOSITION RATES**

STARTING/ COMPLETION DATE : 10/75 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 55000
 TASK CODE=G625B-EA-24 **EPA= ** (GRANT) PRIOR FY /
 EPA OFFICER.: - DURHAM EPA/ESRL - RTP
 INVESTIGATOR.: HICKS ARGONNE NATL LAB
 MILESTONES.... 10/80 -FINAL REPORT
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001947 SSIE-GMA 4599 TASK-G625B-EA-24 AP -625B
 DU -N140 LABT-ALW
 ABSTRACT..... ATMOSPHERIC MEASUREMENTS WILL BE MADE TO DETERMINE THE RATE OF DRY DEPOSITION AT A VARIETY OF SURFACES, INCLUDING GRASS, CROPS, FOREST, SNOW, AND WATER. THES DATA ARE NEEDED FOR CALCULATION OF LONG RANGE AEROSOL TRANSPORT. 1. FIELD STUDY 1: WINTER GRASS IN THE MIDWEST. 2. FIELD STUDY 2: OVER CROPS IN THE MIDWEST. 3. FIELD STUDY 3: OVER SNOW. 4. FIELD STUDY 4: ON FOREST. 5. FIELD STUDY 5: ON WINTER GRASS IN THE SOUTH. 6. FIELD STUDY 6: ON LAKE WATER.

****PROJECT: 01949-AEROMETRIC FIELD STUDY IN VICINITY OF A LARGE POWER PLANT IN COMPLEX TERRAIN**

STARTING/ COMPLETION DATE : 05/76 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 255000
 TASK CODE=G625B-EA-25 **EPA=68-02-2260 ** (CNTR.) PRIOR FY76 / \$ 413000
 EPA OFFICER.: GC HOLZWORTH EPA/ESRL - RTP
 INVESTIGATOR.: WG BIGGS GEOMET INC
 PF STENBERG GEOMET INC
 DE COVER GEOMET INC
 MILESTONES.... 08/78 -REPORT ON FIELD STUDY ON A POWER PLANT IN COMPLEX TERRAIN
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001949 SSIE-GMA 3113 1 EPA -68-02-2260 TASK-G625B-EA-25
 AP -625B DU -N140 LABT-ALW
 ABSTRACT..... THE OBJECTIVE OF THIS FIELD MEASUREMENT PROGRAM IS TO COLLECT A SET OF RELIABLE AEROMETRIC MEASUREMENTS IN THE VICINITY OF THE CLINCH RIVER POWER PLANT IN RUSSELL COUNTY OF SOUTHWESTERN VIRGINIA. CONTINUOUS MEASUREMENTS OF SO2; NO, WIND, AND TEMPERATURE ARE MADE AT 8 FIXED SITES OUT TO 30 KM FROM THE PLANT. AN INSTRUMENTED VAN ROUTINELY MONITORS AIR QUALITY AT LIKELY RECEPTOR LOCATIONS SO2 AND NO ARE MONITORED CONTINUOUSLY AT THE PLANT AND PIBAL AND TEMPERATURE SOUNDINGS ARE MADE DAILY. AFTER THE FIELD DATA ARE ARCHIVED THEY WILL BE ANALYZED TO DETERMINE EFFECTS OF COMPLEX TERRAIN ON TRANSPORT AND DIFFUSION, AND THE AEROMETRIC DATA WILL BE MADE AVAILABLE TO OTHERS, ANALYSTS, M

****PROJECT: 01951-INDEPENDENT AUDIT OF CLINCH RIVER FIELD STUDY**

STARTING/ COMPLETION DATE : 01/77 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 14000
 TASK CODE=G625B-EA-26 **EPA=68-02-2156 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: GC HOLZWORTH EPA/ESRL - RTP
 INVESTIGATOR.: DE WAGONER RESEARCH TRIANGLE INST
 CE DECKER RESEARCH TRIANGLE INST
 MILESTONES.... 09/77 -FINAL REPORT
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001951 SSIE-GMA 2870 1 EPA -68-02-2156 TASK-G625B-EA-26
 AP -625B DU -N140 LABT-ALW
 ABSTRACT..... THE OBJECTIVE OF THIS WORK IS TO CONDUCT AN INDEPENDENT AUDIT OF THE AEROMETRIC MEASUREMENTS IN ORDER TO ESTABLISH THEIR RELIABILITY. AN AUDIT OF THE SYSTEMS (OPERATING PROCEDURES) HAS INDICATED SOME POTENTIAL PROBLEM AREAS, WHICH HAVE BEEN CORRECTED. AN AUDIT OF THE INSTRUMENT MEASUREMENTS HAS BEEN COMPLETED BUT NOT YET RECEIVED. ANOTHER AUDIT OF INSTRUMENT MEASUREMENTS WILL BE CONDUCTED, PROBABLY IN JULY, 19

****PROJECT: 01952-NORTHROP SUPPORT SERVICES**

STARTING/ COMPLETION DATE : 10/76 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 40000
 TASK CODE=G625B-EA-30 **EPA=68-02-2566 ** (CNTR.) PRIOR FY76 / \$ 40000
 EPA OFFICER.: M BUFALINI EPA/ESRL - RTP
 INVESTIGATOR.: S COLOFF NORTHROP SERVICES INC
 MILESTONES.... 00/00 -CONTINUING
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001952 SSIE-GMA 3926 EPA -68-02-2566 TASK-G625B-EA-30
 AP -625B DU -N140 LABT-ALW
 ABSTRACT..... THE CONTRACTOR, NORTHROP SERVICES INC., OPERATES AND MAINTAINS GOVERNMENT PROVIDED FACILITIES AT EPA'S ENVIRONMENTAL RESEARCH CENTER, RESEARCH TRIANGLE PARK, NORTH CAROLINA, IN PROVIDING TECHNICAL SUPPORT TO THE ENVIRONMENTAL SCIENCES RESEARCH LABORATORY IN THE FOLLOWING ACTIVITIES: 1. MOBILE SOURCE EMISSIONS RESEARCH; 2. STATIONARY SOURCE EMISSIONS RESEARCH; 3. GAS KINETICS AND PHYSICS RESEARCH; 4. SPECIAL TECHNIQUES RESEARCH; 5. AEROSOL RESEARCH; 6. AIR INSTRUMENTATION DEVELOPMENT AND TESTING; 7. FLUID MODELING FACILITY OPERATING AND TESTING; 8. SAMPLING AND ANALYSIS METHODS RESEARCH.

****PROJECT: 01953-NORTHROP SUPPORT SERVICES**

STARTING/ COMPLETION DATE : 10/76 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 6000
 TASK CODE=G625B-EA-31 **EPA=68-02-2566 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: M BUFALINI EPA/ESRL - RTP
 INVESTIGATOR.: S COLOFF NORTHROP SERVICES INC
 MILESTONES.... 00/00 -CONTINUING
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001953 SSIE-GMA 3918 EPA -68-02-2566 TASK-G625B-EA-31
 AP -625B DU -N140 LABT-ALW
 ABSTRACT..... THE CONTRACTOR, NORTHROP SERVICES INC., OPERATES AND MAINTAINS GOVERNMENT PROVIDED FACILITIES AT EPA'S ENVIRONMENTAL RESEARCH CENTER, RESEARCH TRIANGLE PARK, NORTH CAROLINA, IN PROVIDING TECHNICAL SUPPORT TO THE ENVIRONMENTAL SCIENCES RESEARCH LABORATORY IN THE FOLLOWING ACTIVITIES: 1. MOBILE SOURCE EMISSIONS RESEARCH; 2. STATIONARY SOURCE EMISSIONS RESEARCH; 3. GAS KINETICS AND PHYSICS RESEARCH; 4. SPECIAL TECHNIQUES RESEARCH; 5. AEROSOL RESEARCH; 6. AIR INSTRUMENTATION DEVELOPMENT AND TESTING; 7. FLUID MODELING FACILITY OPERATING AND TESTING; 8. SAMPLING AND ANALYSIS METHODS RESEARCH.

****PROJECT: 01954-ANALYSIS OF LIDAR DATA**

STARTING/ COMPLETION DATE : 06/76 - 09/77 : FUNDING : ESTIMATED - FY77 / \$ 14000
 TASK CODE=G625B-EA-32 **EPA=68-02-2418 ** (CNTR.) PRIOR FY76 / \$ 40000
 EPA OFFICER.: - WILSON EPA/ESRL - RTP
 INVESTIGATOR.: UTHE S R I INTERNATL
 MILESTONES.... 09/77 -FINAL REPORT
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001954 SSIE-GMA 4564 EPA -68-02-2418 TASK-G625B-EA-32
 AP -625B DU -N140 LABT-ALW
 ABSTRACT..... LIDAR DATA OBTAINED DURING THE SUMMER OF 1976 MISTT FIELD STUDY WILL BE ANALYZED. DURING THAT STUDY THE LIDAR WAS USED PRIMARILY TO LOCATE THE PLUME AT NIGHT. A REPORT DEMONSTRATING THE TYPE OF RESULTS AVAILABLE FROM A LIDAR PROGRAM WILL BE PREPARED.

****PROJECT: 01956-NOAA SUPPORT SERVICES TO EPA**

STARTING/ COMPLETION DATE : 01/77 - 01/78 : FUNDING : ESTIMATED - FY77 / \$ 5000
 TASK CODE=G625B-EA-33 **EPA=D7-0305 ** (IAG) PRIOR FY /
 EPA OFFICER.: - NIEMEYER EPA/ESRL - RTP
 INVESTIGATOR.: HESS US DOC NATL OCEANIC & ATMOSPHERIC ADMIN
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001956 SSIE-GMA 4598 EPA -D7-0305 TASK-G625B-EA-33
 AP -625B DU -N140 LABT-ALW
 ABSTRACT..... PURCHASE VISIBILITY AND RELATED METEOROLOGICAL DATA TAPES FROM THE NATIONAL CLIMATIC CENTER, NOAA.

****PROJECT: 01959-AEROSOL FORMATION AND DEPOSITION IN A FOREST CANOPY**

STARTING/ COMPLETION DATE : 05/77 - 12/77 : FUNDING : ESTIMATED - FY77 / \$ 15000
 TASK CODE=G625B-EA-34 **EPA=R804860-0153** (GRANT) PRIOR FY /
 EPA OFFICER.: - DURHAM EPA/ESRL - RTP
 INVESTIGATOR.: KR KNOERR DUKE UNIV
 MILESTONES.... 12/77 -FINAL REPORT
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001959 SSIE-GMA 4601 EPA -R804860-0153 TASK-G625B-EA-34
 AP -625B DU -N140 LABT-ALW
 ABSTRACT..... AN EXISTING GRANT (#804860, TASK AG-10) WITH DUKE U. WILL BE SUPPLEMENTED FOR CONTINUED OPERATION THOUGH FALL OF 1977. THIS GRANT WILL PROVIDE INFORMATION ON TURBULENT TRANSFER OF HEAT AND MOISTURE WHICH WILL BE USED WITH POLLUTANT PROFILES TO DETERMINE POLLUTANT EMISSION AND DEPOSITION RATES. GKPB WILL CONTINUE THEIR HC EMISSION STUDIES; ARB WILL PERFORM AEROSOL DEPOSITION STUDIES WITH THE PARTICIPATION OF HICKS (ANL) AND BROCK (U. OF TEXAS).

****PROJECT: 01981-AIRCRAFT MEASUREMENTS IN SUPPORT OF AEROSOL RESEARCH STUDIES OF SULFUR INFORMATION AND TRANSPORTS**

STARTING/ COMPLETION DATE : 04/77 - 04/80 : FUNDING : ESTIMATED - FY77 / \$ 5800
 TASK CODE=G625B-EA-36 **EPA=68-02-2709 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: - DURHAM EPA/ESRL - RTP
 INVESTIGATOR.: W VAUGHAN ENVIRONMENTAL MEASUREMENTS INC
 GM KLAUBER ENVIRONMENTAL MEASUREMENTS INC
 CL WHITE ENVIRONMENTAL MEASUREMENTS INC
 GS NEWCOMB ENVIRONMENTAL MEASUREMENTS INC
 MILESTONES.... 04/80 -FINAL REPORT
 PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES... RECN-001961 SSIE-GMA 3778 EPA -68-02-2709 TASK-G625B-EA-36
 AP -625B DU -N140 LABT-ALW
 ABSTRACT..... ENVIRONMENTAL MEASUREMENTS, INC. (EMI) WILL ORGANIZE AND EXECUTE FIELD PROGRAMS FOR THE MEASUREMENT OF POWER PLANT PLUME TRANSPORT, USING AIRCRAFT PLATFORMS AND A VARIETY OF AIR QUALITY INSTRUMENTS. THE PURPOSES OF THESE FIELD PROGRAMS ARE TO: 1. OBTAIN MEASUREMENTS OF CHANGES IN PLUME CHEMISTRY OF THE SAME AIR PARCEL DURING ITS LONG-RANGE TRANSPORT AWAY FROM A POWER PLANT. 2. DEVELOP AN EPA DATA BASE PARALLEL AND COMPLEMENTARY TO THAT OBTAINED BY OTHERS AS PART OF SUCH PROGRAMS AS THE SULFATE REGIONAL EXPERIMENT (SURF). 3. TEST FLY A NEW AND INNOVATIVE INSTRUMENTATION. MEASUREMENTS FOR THE FOLLOWING PARAMETERS WILL BE INCLUDED: SULFATES, SO2, SUB MICRON AEROSOLS, SF6, BSCAT. THIS WORK WILL BE COORDINATED WITH OTHER CONTRACTORS TO PROVIDE BROAD FIELD MEASUREMENTS, DATA ANALYSES AND A FINAL REPORT. AN INITIAL PROJECT WILL BE IN COOPERATION WITH THE ACTIVITIES OF THE ATMOSPHERIC DYNAMICS AND CHEMISTRY SECTION OF BATTELLE-PACIFIC NORTHWEST LABORATORIES (BNW), AS SUPPORTED BY THE ELECTRIC POWER RESEARCH INSTITUTE (EPRI). THE WORK WILL TAKE PLACE IN THE VICINITY OF TWO POWER PLANTS LOCATED IN MICHIGAN AND INDIANA IN MAY 1977.

****PROJECT: 01983-PHOTOCHEMICAL MODEL DEVELOPMENT**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 18000
 TASK CODE=G625B-EA-39 **EPA=68-02-2427 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: - BUFALINI EPA/ESRL - RTP
 INVESTIGATOR.: UNKNOWN S R I INTERNATL
 MILESTONES...: 09/78 -REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-N-001963 SSIE-GMA 4611 EPA -68-02-2427 TASK-G625B-EA-39
 AP -625B DU -N140 LABT-ALW
 ABSTRACT.....: THIS IS ONE OF A MULTI-PART PROJECT WHOSE SUMMARY MAY BE IDENTICAL TO OTHERS. THE OBJECTIVE OF THIS PROGRAM IS TO REFINE AND UPDATE EXISTING KINETIC MECHANISMS THAT DESCRIBE THE FORMATION OF PHOTOCHEMICAL SMOG. TO MEET THIS OBJECTIVE, WE WILL TEST AND MODIFY THESE MECHANISMS BY COMPARING COMPUTED CONCENTRATION-TIME DEPENDENCE OF VARIOUS REACTANTS AND PRODUCTS WITH THOSE OBSERVED EXPERIMENTALLY IN THE SMOG CHAMBER FACILITY AT THE STATEWIDE AIR POLLUTION RESEARCH CENTER (SAPRC), RIVERSIDE, CALIFORNIA. INDIVIDUAL KINETIC MODELS WILL BE DEVELOPED IN CONJUNCTION WITH DATA FOR THE HYDROCARBONS, ETHYLENE, PROPENE, BUTENE-1, TRANS-2-BUTENE, N-BUTENE, 2,3-DIMETHYL-BUTANE, AND TOLUENE. THE MODELS WILL BE COMBINED AND TESTED IN CONJUNCTION WITH SMOG CHAMBER DATA FOR MIXTURES OF HYDROCARBONS THAT MIMICK HYDROCARBON REACTIVITY IN VARIOUS URBAN ATMOSPHERES.

****PROJECT: 01974-IDENTIFICATION AND MEASUREMENT OF INORGANIC COMPOUND EMISSIONS**

STARTING/ COMPLETION DATE : 09/75 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 70000
 TASK CODE=G625B-EB-01 **EPA=68-02-2296 ** (CNTR.) PRIOR FY76 / \$ 216000
 EPA OFFICER.: - KNAPP EPA/ESRL - RTP
 INVESTIGATOR.: HENRY BATTELLE MEMORIAL INST
 MILESTONES...: 01/79 -ISSUE FINAL REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-N-001974 SSIE-GMA 3756 EPA -68-02-2296 TASK-G625B-EB-01
 AP -625B DU -N140 LABT-ALW
 ABSTRACT.....: THE CONTRACTOR SHALL REVIEW METHODS AND DEVELOP PROCEDURES FOR THE COLLECTION, IDENTIFICATION, AND MEASUREMENT OF THE AMOUNTS OF INORGANIC COMPOUNDS EMITTED FROM SOURCES USING FOSSIL FUELS. LABORATORY EVALUATION AND FIELD TESTING AT SOURCES USING OR PROCESSING FOSSIL FUEL (FOSSIL FUEL POWER PLANT, OIL REFINERY, AND COAL CONVERSION) OF THE METHODS SHALL BE CONDUCTED TO OBTAIN EMISSION CHARACTERIZATION DATA. THIS REPORT SHALL BE PERFORMED IN THREE (3) DISTINCT PHASES.

****PROJECT: 01978-THEORETICAL DATA BASE FOR QUANTITATIVE ANALYSIS OF EMPIRICAL DATA ON MOLECULAR COMPOSITION OF PARTICLES BY RAMAN SCATTERING**

STARTING/ COMPLETION DATE : 07/76 - 10/77 : FUNDING : ESTIMATED - FY77 / \$ 18000
 TASK CODE=G625B-EB-03 **EPA=R804659-0151** (GRANT) PRIOR FY /
 EPA OFFICER.: J NADER EPA/ESRL - RTP
 INVESTIGATOR.: M KERKER CLARKSON COLLEGE OF TECH ARTS & SCI/CHEM DEPT
 MILESTONES...: 06/77 -INTERIM REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-N-001976 SSIE-GMA 3212 1 EPA -R804659-0151 TASK-G625B-EB-03
 AP -625B DU -N140 LABT-ALW
 ABSTRACT.....: THE INVESTIGATOR PROPOSES TO PERFORM CALCULATIONS USING A RECENTLY DEVELOPED THEORY TO ESTIMATE THE EFFECT OF PARTICLE SIZE AND REFRACTIVE INDEX ON THE RAMAN SCATTERING CROSS-SECTIONS FOR MOLECULES COMPRISING ALL OR A CONSTITUENT PART OF SMALL PARTICLES. THESE CALCULATIONS WILL BE COORDINATED WITH EXPERIMENTAL WORK AT THE NATIONAL BUREAU OF STANDARDS DIRECTED TOWARDS THE ANALYSIS OF MOLECULAR SPECIES CONTAINED IN SMALL PARTICLES. THE NBS WORK IS BEING SUPPORTED BY EPA THROUGH AN INTERAGENCY AGREEMENT. THE INVESTIGATOR WILL UNDERTAKE THEORETICAL STUDIES TO EXTEND THE PRESENT THEORY TO NONSPHERICAL PARTICLES AND TO NONUNIFORM LIGHT SOURCES. THE NUMERICAL STUDIES WILL PERMIT EXTENSION OF THE PRESENT TECHNIQUE FOR QUALITATIVE ANALYSIS FOR PARTICULATES TO A MORE QUANTITATIVE BASIS. TO THIS TIME NO THEORY HAS BEEN AVAILABLE TO PREDICT THE DEPENDENCE OF THE TOTAL RAMAN SIGNAL ON PARTICLE SIZE, SHAPE, REFRACTIVE INDEX AND ORIENTATION WITH RESPECT TO THE DIRECTIONS OF ILLUMINATION AND COLLECTION. CALCULATIONS TO ELUCIDATE THESE DEPENDENCIES MAY ALSO LEAD TO ESTIMATES OF THE DISTRIBUTION OF THE MOLECULAR SPECIES WITHIN THE PARTICLE (I.E. UNIFORM DISTRIBUTION THROUGHOUT THE PARTICLE OR CONCENTRATION IN A SURFACE LAYER). IF THE THEORY CAN BE EXTENDED TO NONSPHERICAL PARTICLES, THEN COMPUTATIONS CAN BE MADE TO INCLUDE MORE REAL WORLD PARTICLES OTHER THAN SIMPLY SPHERICAL PARTICLES. THE THEORETICAL COMPUTATIONS AND THE EXPERIMENTAL STUDY WILL BE COMPLEMENTARY AND WILL PROVIDE A MORE COMPLETE ASSESSMENT OF RAMAN SCATTERING AS A NONDESTRUCTIVE ANALYTICAL TECHNIQUE FOR DETERMINING MOLECULAR COMPOSITION OF SMALL PARTICLES.

****PROJECT: 01977-FABRICATE ADVANCED SOFTWARE PROGRAMS FOR THE EVALUATION OF GC/MS DATA**

STARTING/ COMPLETION DATE : 10/77 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 11000
 TASK CODE=G625B-EB-06 **EPA= ** (IN-HQ) PRIOR FY /
 IN-HOUSE EFFORT : FY 77 / YEARS : TOTAL PROJECT
 EPA OFFICER.: - KROST EPA/ESRL - RTP ORD/ESRL
 INVESTIGATOR.: UNKNOWN US EPA
 MILESTONES...: 10/78 -FINAL REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-N-001977 SSIE-ZMA 1434 TASK-G625B-EB-06 AP -625B
 DU -N140 LABT-ALW
 ABSTRACT.....: EXISTING DECONVOLUTION SOFTWARE PROGRAMS FOR OVERLAPPING MS PATTERNS WILL BE EVALUATED AND NEW ADVANCED SOFTWARE ROUTINE WILL BE FABRICATE

****PROJECT: 01978-COLLECTION AND ANALYSIS OF CARCINOGENIC VAPORS**

STARTING/ COMPLETION DATE : 06/73 - 06/77 : FUNDING : ESTIMATED - FY77 / \$ 45000
 TASK CODE=G625B-EB-07 **EPA-68-02-1228 ** (CNTR.) PRIOR FY76 / \$ 80000
 EPA OFFICER.: - SAWICKI EPA/ESRL - RTP
 INVESTIGATOR.: ED PELLIZZARI RESEARCH TRIANGLE INST
 MILESTONES....: 06/77 -FINALIZE DEVICES & EQUIPMENT
 00/00 -FINAL REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-001978 SSIE-GMA 4558 EPA -68-02-1228 TASK-G625B-EB-07
 AP -625B DU -N140 LABT-ALW
 ABSTRACT.....: PERFECTION OF PREVIOUSLY DEVELOPED INSTRUMENTATION FOR COLLECTION AND ANALYSIS OF CARCINOGENIC
 VAPORS IN AMBIENT-ATMOSPHERES. DEVELOPMENT OF ANALYTICAL METHODOLOGY TO QUANTITATE AND CHARACTERIZE
 ALL KNOWN CARCINOGENIC VAPORS PRESENT IN AMBIENT ENVIRONMENTS.

****PROJECT: 01979-TECHNIQUES FOR THE MEASUREMENT OF AEROSOL SIZE DISTRIBUTION AND CARBON AND SULFUR CONTENT**

STARTING/ COMPLETION DATE : 10/78 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=G625B-EB-08 **EPA-R803115-03 ** (GRANT) PRIOR FY76 / \$ 25000
 EPA OFFICER.: C SAWICKI EPA/ESRL - RTP
 INVESTIGATOR.: ES MACIAS WASHINGTON UNIV
 RB HUSAR WASHINGTON UNIV
 MILESTONES....: 11/79 -FINAL REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-001979 SSIE-GMA 2717 1 EPA -R803115-03 TASK-G625B-EB-08
 AP -625B DU -N140 LABT-ALW
 ABSTRACT.....: OBJECTIVES AND APPROACH: TO PURSUE WORK IN THREE DISTINCT AREAS OF AEROSOL INSTRUMENTATION AND
 CHARACTERIZATION. THESE INCLUDE DEVELOPMENT OF (A) A SHAPE SENSITIVE AEROSOL PARTICLE SIZE
 SPECTROMETER, (B) A NUCLEAR GAMMA-RAY METHOD TO MEASURE THE CONCENTRATIONS OF LIGHT ELEMENTS SUCH
 AS CARBON, NITROGEN, OXYGEN AND SULFUR AND (C) A PARTICULAR SULFUR ANALYZER. CURRENT
 PLANS/PROGRESS: DURING THE CURRENT PERIOD THE DEVICE AND TECHNIQUES TO MEASURE PARTICLE SIZE HAVE
 BEEN DOCUMENTED WITH LABORATORY AEROSOLS. ADDITIONAL MEASUREMENTS ON ATMOSPHERIC AEROSOLS WILL BE
 MADE IN THE UPCOMING PERIOD. IN THIS PERIOD THE NUCLEAR GAMMA-RAY METHOD WAS BROUGHT INTO ROUTINE
 OPERATION FOR ALL ELEMENTS EXCEPT OXYGEN, AND THIS ANALYTICAL TECHNIQUE WILL BE DEVELOPED IN THE
 NEXT PERIOD. SOME WORK HAS ALSO BEEN DONE ON THE IN-SITU ANALYSIS OF SULFATE AEROSOLS USING THERMAL
 ANALYSIS TECHNIQUES. A MALLOY FPD SULFUR ANALYZER WAS OBTAINED AND LABORATORY TESTED AND CALIBRATED
 AND WILL BE FIELD TESTED UNDER A VARIETY OF CONDITIONS IN THE NEXT YEAR.

****PROJECT: 01981-INTERCOMPARISON OF METHODS TO COLLECT AND ANALYZE AEROSOLS**

STARTING/ COMPLETION DATE : 08/76 - 00/78 : FUNDING : ESTIMATED - FY77 / \$ 22000
 TASK CODE=G625B-EB-09 **EPA-D6-0800 ** (IAG) PRIOR FY /
 EPA OFFICER.: TG DZUBAY EPA/ESRL - RTP
 INVESTIGATOR.: DC CAMP UNIV OF CALIFORNIA LIVERMORE LAB/CHEM DIV
 BW LOO UNIV OF CALIFORNIA LIVERMORE LAB/CHEM DIV
 MILESTONES....: 06/78 -RESULTS OF FIELD STUDY - FINAL REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-001981 SSIE-GMA 3791 EPA -D6-0800 TASK-G625B-EB-09
 AP -625B DU -N140 LABT-ALW
 ABSTRACT.....: OBJECTIVE: DETERMINE THE ABILITY OF RECENTLY DEVELOPED AND PREVIOUSLY AVAILABLE AEROSOL
 INSTRUMENTATION TO QUANTITATIVELY DETERMINE THE CONCENTRATION OF THE TOTAL MASS, SULFATE, LEAD, AND
 OTHER CHEMICAL SPECIES IN THE ATMOSPHERE. APPROACH: CONDUCT AN INTERMETHOD COMPARISON IN WHICH
 REPRESENTATIVE SAMPLERS OF EACH TYPE ARE INCLUDED. CURRENT PLANS/PROGRESS: CONDUCT AN 8-DAY
 INTERCOMPARISON IN CHARLESTON, W.V. DURING MAY OF 1977. THE SAMPLER TYPES TO BE INCLUDED ARE MANUAL
 DICHOTOMOUS, AUTOMATED DICHOTOMOUS, STREAKER, BATELLE IMPACTOR, FILTERS IN SERIES, HI VOL, TWO
 MASS, DIFFUSION BATTERY, AND LUNDGREN IMPACTOR. THE PARTICIPANTS WILL RETURN THE SAMPLES TO THE
 LABORATORY AND PERFORM THE ANALYSES. THE RESULTS FROM EACH PARTICIPANT REPRESENTING EACH METHOD
 WILL BE INTERCOMPARED USING APPROPRIATE STATISTICAL TECHNIQUES. RESULTS TO DATE: STATE OF THE ART
 INSTRUMENTATION WERE INTERCOMPARED FOR MEASURING AIRBORNE PARTICULATE MASS, NITRATE, SULFATE, LEAD,
 AND TRACE ELEMENTS. A MATHEMATICAL TREATMENT OF THE DATA REVEALS THE RELATIVE PERFORMANCE OF THE
 INSTRUMENTS.

****PROJECT: 01983-NORTHROP SUPPORT SERVICES**

STARTING/ COMPLETION DATE : 10/76 - CONT : FUNDING : ESTIMATED - FY77 / \$ 86000
 TASK CODE=G625B-EB-13 **EPA-68-02-2566 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: M BUFALINI EPA/ESRL - RTP
 INVESTIGATOR.: S COLOFF NORTHROP SERVICES INC
 MILESTONES....: 00/00 -CONTINUING
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-001983 SSIE-GMA 3911 EPA -68-02-2566 TASK-G625B-EB-13
 AP -625B DU -N140 LABT-ALW
 ABSTRACT.....: THE CONTRACTOR, NORTHROP SERVICES INC., OPERATES AND MAINTAINS GOVERNMENT PROVIDED FACILITIES AT
 EPA'S ENVIRONMENTAL RESEARCH CENTER, RESEARCH TRIANGLE PARK, NORTH CAROLINA, IN PROVIDING TECHNICAL
 SUPPORT TO THE ENVIRONMENTAL SCIENCES RESEARCH LABORATORY IN THE FOLLOWING ACTIVITIES: 1. MOBILE
 SOURCE EMISSIONS RESEARCH; 2. STATIONARY SOURCE EMISSIONS RESEARCH; 3. GAS KINETICS AND PHYSICS
 RESEARCH; 4. SPECIAL TECHNIQUES RESEARCH; 5. AEROSOL RESEARCH; 6. AIR INSTRUMENTATION DEVELOPMENT
 AND TESTING; 7. FLUID MODELING FACILITY OPERATION AND TESTING; 8. SAMPLING AND ANALYSIS METHODS
 RESEARCH.

****PROJECT: 01984-TASK ORDER TECHNICAL SUPPORT**

STARTING/ COMPLETION DATE : 12/76 - 12/78 : FUNDING : ESTIMATED - FY77 / \$ 30000
 TASK CODE=G625B-EB-14 **EPA= ** (IN-HO) PRIOR FY /
 IN-HOUSE EFFORT : FY 77 / YEARS : TOTAL PROJECT
 EPA OFFICER.: - HOMOLYA EPA/ESRL - RTP
 INVESTIGATOR.: UNKNOWN US EPA ORD/ESRL
 MILESTONES...: 06/77 -EMISSIONS OF HC COMPOUNDS FROM COAL GASIFICATION
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-001984 SSIE-ZMA 1426 TASK-G625B-EB-14 AP -625B
 DU -N140 LABT-ALW
 ABSTRACT.....: FOR FIELD SERVICES IN SUPPORT OF IN-HOUSE STATIONARY SOURCE CHARACTERIZATION OF HC EMISSIONS FROM POWER PLANT, COAL GASIFICATION, AND OTHER ENERGY-RELATED SOURCES.

****PROJECT: 01985-NORTHROP SUPPORT SERVICES**

STARTING/ COMPLETION DATE : 10/76 - CONT : FUNDING : ESTIMATED - FY77 / \$ 15000
 TASK CODE=G625B-EB-15 **EPA=68-02-2566 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: M BUFALINI EPA/ESRL - RTP
 INVESTIGATOR.: S COLOFF NORTHROP SERVICES INC
 MILESTONES...: 00/00 -CONTINUING
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-001985 SSIE-GMA 3910 EPA -68-02-2566 TASK-G625B-EB-15
 AP -625B DU -N140 LABT-ALW
 ABSTRACT.....: THE CONTRACTOR, NORTHROP SERVICES INC., OPERATES AND MAINTAINS GOVERNMENT PROVIDED FACILITIES AT EPA'S ENVIRONMENTAL RESEARCH CENTER, RESEARCH TRIANGLE PARK, NORTH CAROLINA, IN PROVIDING TECHNICAL SUPPORT TO THE ENVIRONMENTAL SCIENCES RESEARCH LABORATORY IN THE FOLLOWING ACTIVITIES: 1. MOBILE SOURCE EMISSIONS RESEARCH; 2. STATIONARY SOURCE EMISSIONS RESEARCH; 3. GAS KINETICS AND PHYSICS RESEARCH; 4. SPECIAL TECHNIQUES RESEARCH; 5. AEROSOL RESEARCH; 6. AIR INSTRUMENTATION DEVELOPMENT AND TESTING; 7. FLUID MODELING FACILITY OPERATION AND TESTING; 8. SAMPLING AND ANALYSIS METHODS RESEARCH.

****PROJECT: 01986-NORTHROP SUPPORT SERVICES**

STARTING/ COMPLETION DATE : 10/77 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 13000
 TASK CODE=G625B-EB-18 **EPA=68-02-2566 ** (CNTR.) PRIOR FY /
 EPA OFFICER.: M BUFALINI EPA/ESRL - RTP
 INVESTIGATOR.: S COLOFF NORTHROP SERVICES INC
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-001986 SSIE-GMA 3909 EPA -68-02-2566 TASK-G625B-EB-18
 AP -625B DU -N140 LABT-ALW
 ABSTRACT.....: THE CONTRACTOR, NORTHROP SERVICES INC., OPERATES AND MAINTAINS GOVERNMENT PROVIDED FACILITIES AT EPA'S ENVIRONMENTAL RESEARCH CENTER, RESEARCH TRIANGLE PARK, NORTH CAROLINA, IN PROVIDING TECHNICAL SUPPORT TO THE ENVIRONMENTAL SCIENCES RESEARCH LABORATORY IN THE FOLLOWING ACTIVITIES: 1. MOBILE SOURCE EMISSIONS RESEARCH; 2. STATIONARY SOURCE EMISSIONS RESEARCH; 3. GAS KINETICS AND PHYSICS RESEARCH; 4. SPECIAL TECHNIQUES RESEARCH; 5. AEROSOL RESEARCH; 6. AIR INSTRUMENTATION DEVELOPMENT AND TESTING; 7. FLUID MODELING FACILITY OPERATION AND TESTING; 8. SAMPLING AND ANALYSIS METHODS RESEARCH.

****PROJECT: 03180-INPUT, DEPOSITION, AND POST DEPOSITIONAL CONVERSION OF ARSENIC**

STARTING/ COMPLETION DATE : 10/76 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 0
 TASK CODE=K625B-210 **EPA=R804881 ** (GRANT) PRIOR FY76 / \$ 115000
 EPA OFFICER.: NL WOLFE EPA/ERL - ATHENS
 INVESTIGATOR.: M ANDERSON UNIVERSITY OF WISCONSIN
 A ANDREN UNIVERSITY OF WISCONSIN
 D ARMSTRONG UNIVERSITY OF WISCONSIN
 MILESTONES...: 10/76 -FUND GRANT
 10/77 -ANNUAL REPORT
 10/78 -FINAL REPORT
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-003160 SSIE-GMA 4145 EPA -R804881 TASK-K625B-210
 AP -625B DU -N140 LABT-ALW
 ABSTRACT.....: THE INPUT, DEPOSITION, AND POST DEPOSITIONAL TRANSPORT AND CONVERSION OF ARSENIC IS BEING EVALUATED IN THE LOWER SECTION OF THE MENOMINEE RIVER AT THE ENTRANCE TO GREEN BAY. ATMOSPHERIC MOBILIZATION AND INPUTS OF ARSENIC TO THE AQUATIC SYSTEM ARE ALSO BEING ASSESSED. THE OBJECTIVES OF THE INVESTIGATION ARE TO : (1) OBTAIN A TOTAL MASS BALANCE OF ARSENIC BY DESCRIBING THE NET ATMOSPHERIC DEPOSITIONAL INPUT, SEDIMENTATION, RESUSPENSION RATES, AND CONVECTIVE TRANSPORT OF ARSENIC; AND (2) ELUCIDATE THE MAJOR CONTROLLING MECHANISMS FOR ARSENIC IN THIS AND OTHER AQUEOUS SYSTEMS IN GENERAL.

****PROJECT: 03162-SORPTION PROPERTIES OF SOILS AND ENERGY-RELATED POLLUTANTS**

STARTING/ COMPLETION DATE : 07/77 - 07/79 : FUNDING : ESTIMATED - FY77 / \$ 458000
 TASK CODE=K625B-215 **EPA=68-03-2555 ** (CNTR.) PRIOR FY /

EPA OFFICER.: DS BROWN EPA/ERL - ATHENS
 INVESTIGATOR.: JC MEANS UNIVERSITY OF ILLINOIS
 J HASSETT UNIVERSITY OF ILLINOIS
 W BANWART UNIVERSITY OF ILLINOIS
 K REINBOLD UNIVERSITY OF ILLINOIS
 S WOOD UNIVERSITY OF ILLINOIS

MILESTONES...: 04/78 -LITERATURE REVIEW REPORT
 07/79 -FINAL REPORT

PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-003162 SSIE-GMA 3934 EPA -68-03-2555 TASK-K625B-215
 AP -625B DU -N140 LABT-ALW

ABSTRACT.....: THIS TWO-YEAR STUDY WILL CENTER ON THE STUDY OF SORPTION PROPERTIES OF ENERGY-RELATED ORGANIC POLLUTANTS AND VARIOUS TYPES OF SOILS AND SEDIMENTS. THE STUDY WILL INCLUDE A DETAILED REVIEW OF THE LITERATURE ON SOIL SORPTION OF ORGANICS AND THE PREPARATION OF A CRITICAL REVIEW ON THE SUBJECT. LABORATORY STUDIES WILL BE CONDUCTED ON TEN SOIL SAMPLES OF VARYING TYPES AND CHARACTERISTICS WITH AT LEAST ELEVEN ORGANIC COMPOUNDS HAVING A BROAD RANGE OF CHEMICAL PROPERTIES. SORPTION ISOTHERMS FOR EACH COMPOUND ON EACH SOIL-SEDIMENT WILL BE DETERMINED USING RADIO-LABELLED CHEMICALS. STATISTICAL ANALYSES OF THE DATA WILL BE RUN USING MULTIVARIANT ANALYSIS TO DETERMINE IF CHEMICAL PROPERTIES AND SOIL/SEDIMENT PROPERTIES CAN BE RELATED TO YIELD PREDICTIVE INFORMATION ABOUT THE BEHAVIOR OF OTHER COMPOUNDS ON THE SOILS STUDIED.

****PROJECT: 03401-MINERALOGY OF OVERBURDEN AS RELATED TO GROUNDWATER DEGRADATION IN THE STRIP MINING OF COAL**

STARTING/ COMPLETION DATE : 12/75 - UNK : FUNDING : ESTIMATED - FY77 / \$ 275000
 TASK CODE=L625B-03 **EPA=R804162-01 ** (GRANT) PRIOR FY76 / \$ 300000

EPA OFFICER.: B NEWPORT EPA/ERL - ADA
 INVESTIGATOR.: DL KLOEPFER COLORADO SCHOOL OF MINES
 JS FRYBERGER COLORADO SCHOOL OF MINES

MILESTONES...: 01/78 -OVERBURDEN MINERALOGY - GROUND WATER QUALITY CORRELATION
 PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-003401 SSIE-GMA 4590 EPA -R804162-01 TASK-L625B-03
 AP -625B DU -N140 LABT-ALW

ABSTRACT.....: OBJECTIVE: THE OBJECTIVE IS TO DEVELOP A METHOD OF PREDICTING POTENTIAL GROUNDWATER DEGRADATION IN STRIP COAL MINING ON THE BASIS OF THE MINERALOGY OF THE OVERBURDEN. APPROACH: THE APPROACH IS TO DETERMINE THE MINERALOGY OF CORES IN UNDISTURBED OVERBURDEN ADJACENT TO SPOIL PILES WHICH HAVE UNDERGONE EXTENSIVE CHEMICAL AND BIOLOGICAL WEATHERING. EXTENSIVE GROUNDWATER QUALITY DATA WILL BE GATHERED FROM WELLS DRILLED THROUGH AND DOWN-DIP FROM SPOIL PILES. USING THIS DATA BASE, A METHOD OF PREDICTING GROUNDWATER QUALITY IN POST COAL STRIP MINING OPERATIONS WILL BE DEVELOPED. CURRENT PROGRESS: THIS PROJECT WAS FUNDED ON DECEMBER 22, 1975. DUE TO ADVERSE CLIMATICAL CONDITIONS IN N.W. COLORADO, INITIAL DRILLING, CORING AND COMPLETION OPERATIONS WERE DELAYED UNTIL MARCH 22, 1976. CORING OPERATIONS HAVE BEEN PARTICULARLY SUCCESSFUL EXCEPT IN SPOIL PILES WHERE HIGH PERCENTAGE CORE RECOVERY IN THIS UNCONSOLIDATED MATERIAL HAS BEEN DIFFICULT TO ATTAIN. PORTABLE WELL PUMPING AND SAMPLING EQUIPMENT UTILIZING EXPANDABLE PACKERS FOR ZONE ISOLATION HAS BEEN SUCCESSFULLY DEMONSTRATED. LYSIMETERS AND ASSOCIATED FLUID RECOVERY SYSTEMS HAVE BEEN INSTALLED IN SELECTED WELLS. WELL SAMPLING WAS BEGUN IN JUNE 1976. ANALYTICAL DATA GENERATED FROM THE INITIAL SAMPLES WILL CONSIST OF OVER 45 PARAMETERS FROM APPROXIMATELY 25 SAMPLES. MINERALOGY OF CORE SAMPLES ARE BEING DETERMINED UTILIZING X-RAY DIFFRACTION AND X-RAY FLUORESCENCE. THE FIRST INTERIM REPORT ON THIS PROJECT IS ON SCHEDULE AND WILL BE FORTHCOMING IN OCTOBER, 1976. A GRANT AMENDMENT, R-804162-01-01, IS DIRECTED TOWARD EXPANDING THE "SCOPE OF WORK" OUTLINED IN EXISTING GRANT R804162-01. THIS AMENDMENT WILL PERMIT SEVERAL ADDITIONAL MINING SITES TO BE STUDIED, THUS BROADENING THE DATA BASE TO INCLUDE VARYING MINERALOGICAL AND CLIMATOLOGICAL CONDITIONS AND STRENGTHENING THE ACCURACY AND APPLICABILITY OF THE PREDICTIVE NATURE OF FINDINGS FORMULATED IN THE ORIGINAL GRANT.

****PROJECT: 04105-FATE AND EFFECTS OF PETROLEUM HYDROCARBONS AND SELECTED TOXIC METALS IN SELECTED MARINE ECOSYSTEMS AND ORGANISMS**

STARTING/ COMPLETION DATE : 08/75 - 00/80 : FUNDING : ESTIMATED - FY77 / \$ 475000
 TASK CODE=V625B-33 **EPA=D6-E693-EM ** (IAG) PRIOR FY76 / \$ 1117500

EPA OFFICER.: CW HALL EPA/HDQTRS- OEMI
 INVESTIGATOR.: DA WOLFE US DOC NATL OCEANIC & ATMOSPHERIC ADMIN

PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
 ORDIS CODES...: REC-004105 SSIE-GMA 3038 1 EPA -D6-E693-EM TASK-V625B-33
 AP -625B DU -N140 LABT-EMI

ABSTRACT.....: THE OVERALL APPROACH OF THIS PROJECT WILL BE TO STUDY EXPERIMENTALLY SPECIFIC PROCESSES CONTROLLING THE DISTRIBUTION, TRANSPORT, AND EFFECTS (BOTH PHYSIOLOGICAL AND ECOLOGICAL) OF PETROLEUM HYDROCARBONS AND SELECTED TOXIC METALS IN SUBARCTIC COASTAL MARINE ECOSYSTEMS TO FACILITATE THE ASSESSMENT OF THE IMPACTS OF PETROLEUM RELEASES IN THIS ECOSYSTEM TYPE. THE PROJECT INCLUDES FOUR INTERDEPENDENT TASKS WITH THE FOLLOWING OBJECTIVES: A. ESTABLISH A NATIONAL NOAA ANALYTICAL CAPABILITY FOR PETROLEUM HYDROCARBONS AND TOXIC METALS IN THE MARINE ENVIRONMENT FOR PURPOSES OF STANDARDIZING ANALYTICAL TECHNIQUES, PROVIDING INTERCALIBRATION SERVICES AND CONDUCTING ROUTINE ANALYSES ON A CONTRACT BASIS. B. IDENTIFY CURRENT STATUS OF KNOWLEDGE AND INFORMATION GAPS ON THE FATE AND EFFECTS OF PETROLEUM HYDROCARBONS IN MARINE SYSTEMS. C. SELECT, ON A PRIORITY BASIS, AND CONDUCT SPECIFIC LABORATORY EXPERIMENTS ON FATE AND EFFECTS OF METALS AND HYDROCARBONS. D. DESIGN AND CONDUCT CONTROLLED EXPERIMENTAL ECOSYSTEM RESEARCH TO DETERMINE CHANGES AT THE ECOSYSTEM LEVEL AND TO TEST OUR ABILITY TO PREDICT ECOLOGICAL AND BIOLOGICAL IMPACTS OF PETROLEUM IN SUBARCTIC ECOSYSTEMS. CURRENT APPROACHES OR PROGRESS ARE, BY OBJECTIVE, AS FOLLOWS: A. ROUTINE ANALYSES OF PETROLEUM HYDROCARBONS IN ENVIRONMENTAL SAMPLES ARE NOW BEING CONDUCTED, AND ANALYTICAL INTERCOMPARISONS ARE BEING COORDINATED, BY THE NATIONAL ANALYTICAL FACILITY AT THE NMFS NORTHWEST AND ALASKA FISHERIES CENTER IN SEATTLE, WASHINGTON. B. A MAJOR SYMPOSIUM, FATE AND EFFECTS OF PETROLEUM HYDROCARBONS IN MARINE ECOSYSTEMS AND ORGANISMS, WAS HELD IN SEATTLE IN NOVEMBER 1976, AND THE PROCEEDINGS WERE PUBLISHED BY PERGAMON PRESS. C. STUDIES UNDERWAY INCLUDE: INTERACTING EFFECTS OF HYDROCARBONS AND OTHER POLLUTANTS ON MARINE ORGANISMS; PETROLEUM EFFECTS ON METALS IN SEDIMENTS; EFFECTS OF PETROLEUM ON CRAB CHEMORECEPTION; AND PETROLEUM EFFECTS ON SEABIRD REPRODUCTION. D. A REPORT ON DESIGN AND FEASIBILITY OF FIELD EXPERIMENTS HAS BEEN PREPA

****PROJECT: 04108-ATMOSPHERIC INTERACTION STUDIES**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 174000
 TASK CODE=V625B-38 **EPA=D6-E721-DL ** (IAG) PRIOR FY76 / \$ 427000

EPA OFFICER.: GD A'LESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: JF MEAGHER US TVA
 HC JONES US TVA
 O HUFF US TVA
 L STOCKBURGER US TVA
 G SHANNON US TVA
 E BAILEY US TVA

MILESTONES...: 01/78 -SO2 REACTION CHAMBER INSTALLED
 05/79 -MILESTONE REPORT - PHOTOOXIDATION OF SO2

PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS

ORDIS CODES...: RECN-004106 SSIE-GMA 4676 EPA -D6-E721-DL TASK-V625B-38
 AP -625B DU -N140 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROJECT IS TO DETERMINE THE CHEMICAL INTERACTIONS OF EMISSIONS FROM COAL-FIRED POWER PLANTS WITH EMPHASIS ON THE RATE OF OXIDATION OF SO2. THE GOAL IS TO PREDICT THE CONCENTRATIONS OF MAJOR CONSTITUENTS AT VARIOUS LOCATIONS DOWNWIND. HIGHLY INSTRUMENTED AIRCRAFT MEASURE THE FLUXES OF THE CONSTITUENTS THROUGH THE PLUME AT A NUMBER OF DOWNWIND DISTANCES. PERTINENT METEOROLOGICAL PARAMETERS ARE MEASURED WITH INSTRUMENTS ON THE AIRCRAFT AND A GROUND STATION. THESE DATA WILL BE UTILIZED TO DEVELOP A PLUME CHEMISTRY MODEL WHICH WILL DETAIL THE PLAUSIBLE MECHANISMS AND KINETICS OF CHEMICAL REACTIONS OCCURRING IN THE PLUME AND THE METEOROLOGICAL INFLUENCES ON THESE REACTIONS. CHAMBER STUDIES OF STACK GASES ARE ALSO BEING INITIATED TO OBTAIN SOME FUNDAMENTAL INFORMATION ON PLUME CHEMISTRY. EMPHASIS FOR THE IMMEDIATE FUTURE STUDIES WILL BE PLACED ON OBTAINING RATES OF OXIDATION OF SO2 IN STACK GAS. TWO STUDIES WERE CONDUCTED IN OCTOBER, 1976 AND AUGUST, 1977 AT TVA'S CUMBERLAND STEAM PLANT. THIS PLANT HAS TWO 1300-MW UNITS EACH FITTED WITH A 1,000-FOOT STACK. THE SECOND STUDY WAS TO DETERMINE THE EFFECT OF INCREASING THE PARTICULATE MASS LOADING ON THE CONVERSION OF SO2 TO SULFATE. SECTIONS OF THE ELECTROSTATIC PRECIPITATOR WERE TURNED OFF TO INCREASE THE PARTICULATE CONCENTRATION. PRELIMINARY RESULTS INDICATE LITTLE OR NO EFFECT OF MASS LOADING ON THE CONVERSION OF SO2 TO SULFATE. AT DISTANCES OF 5 TO 120 KILOMETERS (0.16 TO 11.0 HOURS OF DRIFT) DOWNWIND FROM THE POWER PLANT THE SO2 TO SULFATE CONVERSION WAS LESS THAN 2% PER HOUR. A MILESTONE REPORT ON THE SOX POWER PLANT PLUME CHEMISTRY IS DUE IN NOVEMBER, 1978. THE CONSTRUCTION OF THE REACTION CHAMBER IS COMPLETE WITH EQUIPMENT INSTALLATION TO BE COMPLETED IN JANUARY, 1978. A MILESTONE REPORT ON THE PHOTOOXIDATION OF SO2 IS DUE IN MAY, 1979.

****PROJECT: 04108-REGIONAL ATMOSPHERIC TRANSPORT OF COAL-FIRED POWER PLANT EMISSIONS**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 75000
 TASK CODE=V625B-39 **EPA=D6-E721-DL ** (IAG) PRIOR FY76 / \$ 169000

EPA OFFICER.: GD D'ALESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: V SHARMA US TVA
 HC JONES US TVA
 LM REISINGER US TVA

MILESTONES...: 09/70 -MAJOR PROJECT REPORT

PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS

ORDIS CODES...: RECN-004108 SSIE-GMA 2955 1 EPA -D6-E721-DL TASK-V625B-39
 AP -625B DU -N140 LABT-EMI

ABSTRACT.....: THE SULFUR DIOXIDE/SULFATE ISSUE REQUIRES DEVELOPMENT OF A SCIENTIFIC DATA BASE TO DELINEATE REGIONAL EFFECTS OF COAL-FIRED POWER PLANT EMISSIONS, AND CHARACTERIZATION AND QUANTIFICATION OF THE MECHANISMS OF LONG-RANGE TRANSPORT OF EMISSIONS. A LONG-RANGE TRANSPORT MODEL DESCRIBING THE CONSERVATION BALANCE OF SO2/SULFATE COMPLEX IS BEING DEVELOPED AND APPLIED TO A MESO-SCALE REGION (APPROXIMATELY 1,000 KM) CENTERED OVER THE TENNESSEE VALLEY WATERSHED. AMONG FACTORS BEING CONSIDERED ARE ADVECTION BY WIND FIELD, AIR PARCEL TRAJECTORIES, DIFFUSION BY ATMOSPHERIC TURBULENCE, SOURCE/SINK MECHANISMS, AND CHEMICAL TRANSFORMATIONS. A REGIONAL SO2 EMISSIONS INVENTORY HAS BEEN ACQUIRED AND MAINTAINED BY CONTINUAL UPDATING. FIELD STUDIES WERE CONDUCTED IN SPRING 1976 AND SUMMER 1977. DATA ARE BEING ANALYZED AND A REGIONAL ATMOSPHERIC TRANSPORT MODEL IS BEING DEVELOPED. SOME FINDINGS HAVE BEEN REPORTED IN INTERNAL REPORTS AND PROFESSIONAL JOURNALS.
 MAJOR M

****PROJECT: 04110-EVALUATION AND IMPROVEMENT OF MODELS USED FOR RADIOLOGICAL IMPACT**

ASSESSMENT OF GASEOUS RELEASES FROM NUCLEAR POWER PLANTS
 STARTING/ COMPLETION DATE : 05/75 - 04/78 : FUNDING : ESTIMATED - FY77 / \$ 44000
 TASK CODE=V625B-41 **EPA=D7-E721-DM ** (IAG) PRIOR FY76 / \$ 105000

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
 INVESTIGATOR.: EA BELVIN US TVA
 EA BELVIN US TVA
 PH JENKINS US TVA
 RL DOTY US TVA

MILESTONES...: 10/78 -PROJECT TERMINATION

PLAN ID.....: (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS

ORDIS CODES...: RECN-004110 SSIE-GMA 4675 EPA -D7-E721-DM TASK-V625B-41
 AP -625B DU -N140 LABT-EMI

ABSTRACT.....: OBJECTIVE: TO OBTAIN DATA USABLE IN THE EVALUATION AND REFINEMENT OF ANALYTICAL MODELS USED FOR RADIOLOGICAL IMPACT ASSESSMENT OF NUCLEAR POWER OPERATIONS. EMPHASIS WILL BE PLACED ON THE COLLECTION OF DATA RELATED TO MODELS USED TO PREDICT RADIATION DOSES FROM TWO COMPONENTS OF DIRECT RADIATION: (A) FROM RADIOACTIVE MATERIALS CONFINED WITHIN THE PLANT AND (B) FROM RADIOACTIVE MATERIALS IN THE GASEOUS EFFLUENT PLUME. APPROACH: EXTERNAL GAMMA RADIATION EXPOSURE RATES WILL BE MEASURED IN THE VICINITY OF A RIVERSIDE NUCLEAR POWER REACTOR USING PRESSURIZED IONIZATION CHAMBERS. BACKGROUND RADIATION LEVELS WILL BE DETERMINED. RADIATION LEVELS DURING PLANT OPERATION WILL BE DETERMINED AND METHODS FOR DETECTION OF A GASEOUS EFFLUENT PLUME WILL BE STUDIED. ATTEMPTS WILL BE MADE TO CORRELATE EXPOSURE RATES IN THE ENVIRONMENT WITH EFFLUENT CHARACTERISTICS OF THE REACTOR COMPLEX. RESULTS/STATUS: BACKGROUND RADIATION LEVELS AROUND BROWNS FERRY NUCLEAR PLANT WERE DETERMINED AND PRELIMINARY OPERATIONAL DATA WERE COLLECTED. ANALYSES OF THE DATA FROM THE ENVIRONMENT AND EFFLUENT INFORMATION FROM THE PLANT ARE BEING PERFORMED IN TERMINATING THIS PROJECT. (PROJECT TO BE TERMINATED IN F.Y. 1978 DUE TO TERMINATION OF CONGRESSIONAL FUNDING).

****PROJECT: 04113-SIMULATION OF THERMAL DISPERSION AND FLUID MECHANICS AT CRITICAL LOCATIONS IN STREAMS & RESERVOIRS**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 31000
TASK CODE=V625B-58 **EPA=D5-E721-DN ** (IAG) PRIOR FY76 / \$ 74000

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
INVESTIGATOR.: WR WALDROP US TVA
WL HARPER US TVA

PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
ORDIS CODES... RECN-004113 SSIE-GMA 2988 1 EPA -D5-E721-DN TASK-V625B-58
AP -625B DU -N140 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THIS STUDY IS TO DEVELOP COMPUTER MODELS FOR ANALYZING THE EFFECTS OF THERMAL DISCHARGES ON THE TEMPERATURE AND VELOCITY DISTRIBUTIONS IN THE RECEIVING WATER BODY. THREE-DIMENSIONAL NEAR-FIELD AND FAR-FIELD MODELS ARE BEING DEVELOPED. A THREE-DIMENSIONAL MODEL HAS BEEN USED FOR THE EVALUATION OF A TVA STEAM PLANT, AND A TWO-DIMENSIONAL MODEL PRESENTLY UNDER DEVELOPMENT WILL BE USED AS AN AID IN ASSESSING THE CUMULATIVE EFFECTS OF MULTIPLE STEAM-NUCLEAR PLA

****PROJECT: 04115-EFFECTS OF ENTRAINMENT IN COOLING SYSTEMS ON FISH EGGS AND LARVAE**

STARTING/ COMPLETION DATE : 07/75 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 250000
TASK CODE=V625B-60 **EPA=D5-E681-CD ** (IAG) PRIOR FY76 / \$ 250000

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
INVESTIGATOR.: JS SUFFERN U.S. DEPT. OF ENERGY
KD KUMAR U.S. DEPT. OF ENERGY
RJ KEDL U.S. DEPT. OF ENERGY
CC COULTANT U.S. DEPT. OF ENERGY

PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
ORDIS CODES... RECN-004115 SSIE-GMA 5366 EPA -D5-E681-CD TASK-V625B-60
AP -625B DU -N140 LABT-EMI

ABSTRACT..... THE KEY OBJECTIVE OF THIS PROJECT IS TO DETERMINE THE QUANTITATIVE RELATIONSHIPS BETWEEN MORTALITY OF FISH EGGS AND LARVAE AND FLUID-INDUCED PHYSICAL STRESSES ENCOUNTERED IN POWER PLANT COOLING SYSTEMS, BOTH ALONE AND IN COMBINATION WITH OTHER STRESSES (THERMAL, CHEMICAL, MECHANICAL) IN ORDER TO DETERMINE THE THRESHOLD VALUES OF ENGINEERING PARAMETERS BELOW WHICH MORTALITIES ARE MINIMIZED. THE CURRENT CRITICAL OBJECTIVE OF THIS MULTIDISCIPLINARY PROJECT IS TO EVALUATE THE ENGINEERING CHARACTERISTICS AND FISH-PASSAGE PERFORMANCES OF CIRCULATING WATER PUMPS. SPECIFIC OBJECTIVES TOWARD ATTAINING THE CURRENT CRITICAL OBJECTIVES ARE: 1) TO ESTIMATE, THROUGH ENGINEERING EVALUATION, THE MECHANICAL AND HYDRAULIC CHARACTERISTICS OF CONTEMPORARY POWER STATION PUMPS (AND THEIR PRINCIPAL ALTERNATIVES) THAT CONTRIBUTE MOST TO DAMAGE OF FISH EGGS AND LARVAE. 2) TO PROVIDE AN EXPERIMENTAL PUMP SYSTEM CAPABLE OF PASSING TEST FISH THROUGH A VARIETY OF DESIGN CONFIGURATION. 3) TO SPAWN AND REAR SUFFICIENT FISH FOR CONDUCT OF EXPERIMENTS HAVING LARGE ENOUGH SAMPLE SIZES FOR HIGH STATISTICAL CONFIDENCE IN THE RESULTS. 4) TO DETERMINE THE SURVIVAL OF FISH EGGS AND LARVAE OF SEVERAL SPECIES AFTER PASSAGE THROUGH A VARIETY OF HYDRAULIC CONFIGURATIONS IN THE TEST PUMP APPARATUS. PROGRESS TO DATE: THE TEST PUMP APPARATUS (CALLED A POWER PLANT COOLING SYSTEM SIMULATOR) HAS BEEN DESIGNED, BUILT AND TESTED. CONTAINING A MIXED-FLOW PUMP PIPING AND CONDENSER TUBING, THE DEVICE WILL ALLOW DETAILED EXAMINATION OF THE PHYSICAL STRESSES ASSOCIA

****PROJECT: 04118-LONG-TERM EFFECTS OF OIL ON MARINE COMMUNITIES AND ASSOCIATED ORGANISMS**

STARTING/ COMPLETION DATE : 06/75 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 190000
TASK CODE=V625B-61 **EPA=D6-E681-CF ** (IAG) PRIOR FY76 / \$ 488000

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI
INVESTIGATOR.: JW ANDERSON BATTELLE MEMORIAL INST ECOSYSS
RM BEAN BATTELLE MEMORIAL INST ECOSYSS
RG RILEY BATTELLE MEMORIAL INST ECOSYSS

PLAN ID..... (AP-625B)(DU-N140) TRANSPORT AND FATE OF ENERGY-RELATED POLL. IN ECOSYSTEMS
ORDIS CODES... RECN-004118 SSIE-GMA 5360 EPA -D6-E681-CF TASK-V625B-61
AP -625B DU -N140 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THIS PROGRAM IS TO DEFINE THE CONCENTRATIONS OF HYDROCARBONS FROM PRUDHOE BAY CRUDE OIL, WHICH ARE DELETERIOUS TO MARINE ORGANISMS AND COMMUNITIES WHEN PRESENT IN THE WATER COLUMN OR ASSOCIATED WITH SEDIMENTS FOR PERIODS OF MONTHS. OUR RESEARCH PROGRAM HAS BEEN DESIGNED TO PROVIDE THE DATA NECESSARY TO ASSESS THE EFFECTS OF LONG-TERM EXPOSURE TO PETROLEUM HYDROCARBONS ON SELECTED ORGANISMS AND COMMUNITIES FROM THE NORTHWEST U. S. COASTAL ECOSYSTEMS. THE TYPES OF STUDIES IN PROGRESS INCLUDE: (A) CONSTANT EXPOSURE OF SELECTED SPECIES TO A WELL-CHARACTERIZED EXTRACT OF PRUDHOE BAY CRUDE OIL TO DETERMINE RELATIONSHIPS BETWEEN CONCENTRATION, EXPOSURE TIME, AND MORTALITY, AS WELL AS HYDROCARBON UPTAKE AND RELEASE RATES. (B) EXPOSURE OF ORGANISMS EITHER IN THE FIELD OR LABORATORY TO SEDIMENTS CONTAMINATED WITH HYDROCARBONS TO VARYING DEGREES TO DETERMINE BIOAVAILABILITY AND EFFECTS, AND (C) IN SITU DEPURATION STUDIES ON THE RATES OF RELEASE OF HYDROCARBONS FROM SEDIMENT PREVIOUSLY CONTAMINATED. WHILE, AT THE SAME TIME, MONITORING OF THE RECRUITMENT RATE OF BENTHIC ORGANISMS IN THESE SEDIMENTS. THE ENTIRE PROGRAM CLOSELY INTEGRATES THE ANALYTICAL EXPERTISE OF THE ENVIRONMENTAL CHEMISTRY SECTION WITH THE EXPERIMENTAL APPROACHES OF MARINE BIOLOGISTS IN THE MARINE SCIENCES SECTION. WHILE UTILIZING "STATE-OF-THE-ART" TECHNIQUES, DEVELOPMENT IS TAKING PLACE TO PRODUCE BETTER ANALYTICAL METHODS AND EXPERIMENTAL APPROACHES TO MORE CLOSELY DEFINE THE TRANSPORT OF HYDROCARBONS AND THEIR EFFECTS UNDER NATURAL CONDITIONS.

Measurement Systems and Instrumentation

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****PROJECT: 00107-CONTINUOUS MONITORING OF TOTAL DISSOLVED GAS PRESSURE**

STARTING/ COMPLETION DATE : 12/75 - 12/77 : FUNDING : ESTIMATED - FY77 / \$ 25000
 TASK CODE=A625C-14 **EPA-R804175-02 ** (GRANT) PRIOR FY /
 EPA OFFICER.: JF KOPP EPA/EMSL - CINC
 INVESTIGATOR.: BG DAOUST VIRGINIA MASON RES CTR
 HR SEIBOLD VIRGINIA MASON RES CTR
 PLAN ID..... (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES... REC-N-000107 SSIE-GMA 3532 1 EPA -R804175-02 TASK-A625C-14
 AP -625C DU -N140 LABT-MTS

ABSTRACT..... SUPERSATURATION OF AIR IN NATURAL WATERS EITHER BY HYDROELECTRIC PLANTS OR THERMAL EFFLUENTS IS BECOMING AN INCREASING ENVIRONMENTAL PROBLEM AND HAS ALREADY ACCOUNTED FOR LARGE MORTALITIES OF ANADROMOUS FISH IN THE NORTHWESTERN UNITED STATES. INCREASING DEVELOPMENT OF HYDROELECTRIC AND/OR NUCLEAR PLANTS AS A RESULT OF INCREASED ENERGY NEEDS CAN BE EXPECTED TO INCREASE THIS PROBLEM. DEFINITION OF WHICH REQUIRES LESS SPECIALIZED, EASILY AVAILABLE ANALYTICAL TECHNIQUES. THE METHODS CURRENTLY AVAILABLE FOR MEASURING AND/OR MONITORING TOTAL DISSOLVED GAS PRESSURE IN LIQUIDS, WHILE ACCURATE AND RELIABLE, ARE EXPENSIVE, REQUIRE SPECIALISTS FOR OPERATION, AND ARE NOT SUITABLE FOR CONTINUOUS UNATTENDED MONITORING. THE OBJECTIVE OF THE PROJECT IS THE FURTHER DEVELOPMENT OF SIMPLE, INEXPENSIVE INSTRUMENTATION USING THE EXISTING PRINCIPLE OF A DIFFUSION MEMBRANE AND ELECTRONIC PRESSURE TRANSDUCER TO MEASURE AND RECORD TOTAL DISSOLVED GAS PRESSURES. ALTERNATIVES FOR MEMBRANE MATERIALS, CONFIGURATIONS AND MECHANICAL INTERFACES AND SIGNAL ANALYSIS WILL BE EXPLORED, CONSTRUCTED AND FIELD TESTED.

****PROJECT: 00110-ION EXCHANGE MEMBRANES APPLIED TO NEW METHODS OF SAMPLING, ENRICHMENT AND SPECIATION IN WATER ANALYSIS**

STARTING/ COMPLETION DATE : 10/75 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 32692
 TASK CODE=A625C-15 **EPA-R804179-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: JF KOPP EPA/EMSL - CINC
 INVESTIGATOR.: WJ BLAEDEL UNIV OF WISCONSIN LETTERS & SCI/CHEM DEPT
 PLAN ID..... (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES... REC-N-000110 SSIE-GMA 3536 EPA -R804179-01 TASK-A625C-15
 AP -625C DU -N140 LABT-MTS

ABSTRACT..... A CATION EXCHANGE MEMBRANE ENVELOPE FOR SAMPLING AND ENRICHMENT OF TRACE CATION IN A WATER SAMPLE WILL BE DESIGNED, CONSTRUCTED, AND STUDIED. IN PRINCIPLE, FOR WATER SAMPLES OF LOW OR MODERATE IONIC STRENGTHS, ENRICHMENTS OF TWO ORDERS OF MAGNITUDE SHOULD BE ACHIEVABLE BY TRANSPORT OF THE TRACE CATIONS FROM THE WATER SAMPLE THROUGH THE MEMBRANE INTO A SMALL VOLUME OF AN ACCEPTOR SOLUTION OF CONTROLLED COMPOSITION. THE ACCEPTOR SOLUTION WOULD THEN BE USED FOR MEASUREMENT OF THE TRACE ION CONCENTRATIONS, AT HIGHER LEVELS, AND MORE EASILY THAN THE ORIGINAL WATER SAMPLE. A COPPER ION-SELECTIVE ELECTRODE WILL BE COVERED WITH A CATION EXCHANGE MEMBRANE TRAPPING A SMALL VOLUME OF AN ACCEPTOR SOLUTION OF CONTROLLED COMPOSITION IN BETWEEN. UPON IMMERSION IN A WATER SAMPLE, ANY TRACE CU(II) IN THE WATER SAMPLE SHOULD BE ENRICHED IN THE ACCEPTOR SOLUTION, TO LEVELS THAT CAN BE MORE EASILY MEASURED BY THE COPPER ION-SELECTIVE ELECTRODE. THE ENRICHMENT FACTORS FOR BOTH OF THESE DEVICES ARE IN PRINCIPLE INDEPENDENT OF THE PROPERTIES OF THE MEMBRANE AND OF ALL OF THE PROPERTIES OF THE TRACE CATION EXCEPT THE CHARGE. WITH PROPER DESIGN, THESE DEVICES SHOULD OPERATE IN THE NANOMOLAR CONCENTRATION REGION. (TEXT ABRIDGED.)

****PROJECT: 00112-A COMPARATIVE SELECTIVITY STUDY OF THE NITROGEN OXIDE ELECTRODE AND THE SOLID STATE NITRATE ELECTRODE FOR DETERMINATION OF NITRATE**

STARTING/ COMPLETION DATE : 10/77 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 28000
 TASK CODE=A625C-20 **EPA-R805212-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: ME GALES EPA/EMSL - CINC
 INVESTIGATOR.: RF WILSON TEXAS SOUTHERN UNIV ARTS & SCI/CHEM DEPT
 PLAN ID..... (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES... REC-N-000112 SSIE-GMA 3818 EPA -R805212-01 TASK-A625C-20
 AP -625C DU -N140 LABT-MTS

ABSTRACT..... THE OBJECTIVE OF THIS STUDY IS TO EVALUATE THE NITRATE ELECTRODES AND OPTIMIZE CONDITION FOR THE ANALYSIS OF NITRATE IN A VARIETY OF WATER AND WASTE WATER SAMPLES. THE COMPLETION OF THIS RESEARCH SHOULD PROVIDE EPA WITH A SELECTIVE, EFFICIENT AND ECONOMICAL METHOD FOR THE QUANTITATIVE DETERMINATION OF NITRATE.

****PROJECT: 00114-EVALUATION OF THE DIONEX ION EXCHANGE CHROMATOGRAPH FOR NATURAL WATER SAMPLES ANALYSIS**

STARTING/ COMPLETION DATE : 08/77 - 01/79 : FUNDING : ESTIMATED - FY77 / \$ 28058
 TASK CODE=A625C-22 **EPA-R805329-01 ** (GRANT) PRIOR FY /
 EPA OFFICER.: ME GALES EPA/EMSL - CINC
 INVESTIGATOR.: A SCHLUETER CENTRAL STATE UNIV
 PLAN ID..... (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES... REC-N-000114 SSIE-GMA 3813 EPA -R805329-01 TASK-A625C-22
 AP -625C DU -N140 LABT-MTS

ABSTRACT..... THE ION-EXCHANGE CHROMATOGRAPH MANUFACTURED BY DIONEX CORP. HAS THE POTENTIAL OF SEPARATING AND QUANTITATIVELY DETERMINING THE CONCENTRATIONS OF ANIONS AND CATIONS PRESENT IN NATURAL WATERS. THIS PROJECT WILL EVALUATE THE DIONEX ION-EXCHANGE CHROMATOGRAPH TO DETERMINE ITS ABILITY AND LIMITATIONS IN ANALYZING NATURAL WATER SAMPLES FOR ANIONS A

****PROJECT: 00115-PROVIDE QUANTITATIVE ANALYTICAL SERVICES TO THE QA BRANCH**

STARTING/ COMPLETION DATE : 06/76 - 06/79 : FUNDING : ESTIMATED - FY77 / \$ 15000
 TASK CODE=A625C-36 **EPA=68-03-2404 ** (CNTR.) PRIOR FY76 / \$ 20000
 EPA OFFICER.: E BERG EPA/EMSL - CINC L F E CORP ENV ANALYSIS LABS DIV
 INVESTIGATOR.: G DUNSTAN
 MILESTONES...: 09/77 -COMPLETE ANALYTICAL VERIFICATION OF QC SAMPLES PRODUCED INHOUSE
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: REC-N-000115 SSIE-GMA 3169 1 EPA -68-03-2404 TASK-A625C-36
 AP -625C DU -N140 LABT-MTS
 ABSTRACT.....: QUALITY CONTROL SAMPLES ARE DESIGNED, DEVELOPED AND PRODUCED BY THE QUALITY ASSURANCE BRANCH OF AN OUTSIDE CONTRACTOR. WHATEVER THE PRODUCTION SOURCE, A SIGNIFICANT NUMBER OF SAMPLES MUST BE WITHDRAWN FROM THE LOT AND SUBMITTED TO A REFEREE ANALYTICAL LABORATORY TO VERIFY THAT THE QC SAMPLES ARE PREPARED ACCORDING TO SPECIFICATIONS. LFE ENVIRONMENTAL ANALYSIS, INC. IS ONE OF TWO REFEREE LABORATORIES ENGAGED IN VERIFYING ORGANIC AND INORGANIC QUALITY CONTROL SAMPLES.

****PROJECT: 01348-QUALITY ASSURANCE IN SUPPORT OF ENERGY-RELATED MONITORING ACTIVITIES IN THE WESTERN USA**

STARTING/ COMPLETION DATE : 07/76 - 07/81 : FUNDING : ESTIMATED - FY77 / \$ 200000
 TASK CODE=E625C-11 **EPA=68-02-2412 ** (CNTR.) PRIOR FY76 / \$ 522000
 EPA OFFICER.: SM BROMBERG EPA/EMSL - RTP ROCKWELL INTERNATIONAL CORP
 INVESTIGATOR.: M CHER
 MILESTONES...: 09/76 -CONDUCTED ON-SITE SYSTEMS REVIEWS AND ASSESSMENTS
 01/77 -INITIATED QUARTERLY "BLIND" SAMPLE PERFORMANCE EVALUATIONS
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: REC-N-001346 SSIE-GMA 3116 1 EPA -68-02-2412 TASK-E625C-11
 AP -625C DU -N140 LABT-MTS
 ABSTRACT.....: OBJECTIVES: DEVELOP AND IMPLEMENT A QUALITY ASSURANCE PROGRAM FOR AIR POLLUTION MONITORING IN THE VICINITY OF PRESENT AND PROPOSED ENERGY DEVELOPMENT PROJECTS IN THE WESTERN USA. APPROACHES: 1) PROVIDE ON-SITE SYSTEMS REVIEWS AND ASSESSMENTS FOR AGENCIES MONITORING FOR AIR POLLUTANTS IN 8 WESTERN STATES; 2) CONDUCT QUARTERLY PERFORMANCE EVALUATION USING "BLIND" SAMPLES; AND 3) PROVIDE TECHNICAL ASSISTANCE AS REQUIRED. OUTPUTS: REPORTS ON EACH OF THE ABOVE ACTIVITIES AND AIR QUALITY DATA OF IMPROVED QUALITY.

****PROJECT: 02953-MONITORING THE IMPACT OF WESTERN COAL STRIP MINING AND OIL SHALE EXTRACTION ON GROUNDWATER QUALITY**

STARTING/ COMPLETION DATE : 09/76 - 10/81 : FUNDING : ESTIMATED - FY77 / \$ 265000
 TASK CODE=J625C-65 **EPA=68-03-2449 ** (CNTR.) PRIOR FY76 / \$ 600000
 EPA OFFICER.: LG MCMILLION EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: R TINLIN GENERAL ELECTRIC CO
 MILESTONES...: 10/77 -COLLECT, ORGANIZE, AND INTERPRET BACKGROUND DATA
 06/78 -DESIGN THE MONITORING PROGRAM
 01/79 -IMPLEMENT THE MONITORING PROGRAM FOR COAL STRIP MINING
 10/81 -IMPLEMENT THE MONITORING PROGRAM FOR OIL SHALE
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: REC-N-002953 SSIE-GMA 3189 1 EPA -68-03-2449 TASK-J625C-65
 AP -625C DU -N140 LABT-MTS
 ABSTRACT.....: OBJECTIVES: THE PRINCIPAL OBJECTIVE IS TO DEVELOP AND VALIDATE IN AT LEAST TWO AREAS A STRATEGY FOR MONITORING GROUNDWATER QUALITY ALTERATIONS THAT ARE OCCURRING OR COULD POTENTIALLY OCCUR AS A CONSEQUENCE OF THE STRIP MINING OF COAL; MINING AND PROCESSING OF OIL SHALE; CONVERSION OF THESE RESOURCES; AND EFFECTS OF OTHER RELATED SITUATIONS (SUCH AS POPULATION INCREASES AND INDUSTRIAL DEVELOPMENTS). THE AREAS TO BE MONITORED WILL BE IN THE WESTERN UNITED STATES. APPROACH: THE DEVELOPMENT OF THE MONITORING STRATEGY WILL FOLLOW, IN GENERAL, THE METHODOLOGY THAT IS DESCRIBED IN THE RECENTLY PRINTED EPA REPORT ENTITLED "MONITORING GROUNDWATER QUALITY: MONITORING METHODOLOGY." A NECESSARY PREREQUISITE TO THE DEVELOPMENT OF THE STRATEGY WILL BE THE COLLECTION AND EVALUATION OF CONSIDERABLE DATA ON SUBJECTS SUCH AS THE FOLLOWING: GEOLOGY, WATER CHEMISTRY, IDENTIFIABLE POLLUTANTS, AQUIFER HYDRAULIC CHARACTERISTICS, MINING METHODS, LAND RECLAMATION PROCESSES, OIL SHALE PROCESSING METHODS, AND PRACTICES FOR DISPOSAL OF WASTE SUBSTANCES. THE EVALUATIONS WILL INCLUDE IDENTIFICATION OF POLLUTANTS AND THE PRIORITIZATION OF POLLUTION SOURCES. THE ACTUAL FIELD MONITORING WILL BE CONDUCTED TO SHOW THE VALIDITY AND METHOD OF APPLICATION OF THE MONITORING STRATEGY. OUTPUTS: OUTLINES AND DRAFT MATERIALS FOR THE FIRST PHASE OF THE WORK HAVE BEEN PREPARED FOR MONITORING APPROACHES AND METHODS; SOURCES OF POLLUTION AND METHODS OF WASTE DISPOSAL; IDENTIFICATION OF POTENTIAL POLLUTANTS; GROUNDWATER USAGE; AND HYDROLOGIC FRAMEWORK.

****PROJECT: 02955-ENERGY-RELATED RADIOLOGICAL POLLUTANT MONITORING AND TECHNIQUES DEVELOPMENT**

STARTING/ COMPLETION DATE : 10/74 - 12/80 : FUNDING : ESTIMATED - FY77 / \$ 23500
 TASK CODE=J625C-66 **EPA= ** (IN-HO) PRIOR FY76 / \$ 144000
 IN-HOUSE EFFORT : FY 77 / 01.0 YEARS : TOTAL PROJECT 01.0
 EPA OFFICER.: EW BRETTBAUER EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: EW BRETTBAUER US EPA
 MILESTONES....: 07/77 -CHARACTERIZATION OF EMISSIONS FROM A PU-U OXIDE FUEL FABRICATION
 07/77 -COLLABORATIVELY TESTED METHOD FOR MEASURING PLUTONIUM IN SOIL (FU
 01/78 -COLLABORATIVELY TESTED METHOD FOR MEASURING PLUTONIUM IN SOIL (AC I
 10/78 -COLLABORATIVELY TESTED METHOD FOR MEASURING PLUTONIUM IN AIR
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: REC-002955 SSIE-ZMA 1057 TASK-J625C-66 AP -625C
 DU -N140 LABT-MTS

ABSTRACT.....: OBJECTIVE: CONDUCT RESEARCH ON THE DEVELOPMENT OF TECHNIQUES TO MONITOR POTENTIALLY HAZARDOUS EFFLUENTS AND EMISSIONS FROM NUCLEAR FUEL CYCLE FACILITIES. APPROACH: CHARACTERIZE THE PHYSICAL AND CHEMICAL PROPERTIES AND RADIATION LEVELS OF PLUTONIUM AND OTHER ACTINIDE DISCHARGES FROM A MIXED URANIUM AND PLUTONIUM OXIDE FUEL FABRICATION FACILITY. RECOMMEND AND COLLABORATIVELY TEST METHODS FOR MONITORING PLUTONIUM, URANIUM AND THORIUM IN SOIL, AIR AND WATER, INCLUDING THE DEVELOPMENT OF APPROPRIATE REFERENCE MATERIALS FOR CALIBRATION. OUTPUTS: THE PHYSICAL AND CHEMICAL PROPERTIES AND RADIATION LEVELS OF PLUTONIUM AND URANIUM DISCHARGES HAVE BEEN CHARACTERIZED FROM STACK AND ENVIRONMENTAL SAMPLES COLLECTED AT A MIXED URANIUM-PLUTONIUM OXIDE FUEL FABRICATION FACILITY. THE SAMPLES WERE ANALYZED AND INDIVIDUAL EFFLUENT PARTICLES WERE CHARACTERIZED IN TERMS OF ACTIVITY, SIZE, SHAPE, ELEMENTAL COMPOSITION AND OTHER PARAMETERS BY INTERAGENCY AGREEMENT WITH THE U.S. AIR FORCE TECHNICAL APPLICATIONS CENTER. A FUSION METHOD AND AN ACID DISSOLUTION METHOD FOR THE MEASUREMENT OF PLUTONIUM IN SOIL HAVE BEEN EVALUATED AND COLLABORATIVELY TESTED. EFFORTS ARE UNDERWAY TO PREPARE APPROPRIATE REFERENCE MATERIAL AND COLLABORATIVELY TEST A METHOD FOR MEASURING PLUTONIUM IN AIR.

****PROJECT: 02957-COLLABORATIVELY TEST METHODS FOR MEASURING URANIUM IN ENVIRONMENTAL SAMPLES**

STARTING/ COMPLETION DATE : 07/76 - 06/78 : FUNDING : ESTIMATED - FY77 / \$ 51500
 TASK CODE=J625C-67 **EPA=D7-0015 ** (IAG) PRIOR FY76 / \$ 65000
 EPA OFFICER.: EW BRETTBAUER EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: B ROBINSON MONSANTO RES CORP MOUND LAB
 MILESTONES....: 10/77 -COLLABORATIVELY TESTED METHOD FOR MEASURING PLUTONIUM IN WATER
 01/78 -COLLABORATIVELY TESTED METHOD FOR MEASURING URANIUM IN WATER
 06/78 -COLLABORATIVELY TESTED METHOD FOR MEASURING AMERICIUM IN SOIL
 10/78 -COLLABORATIVELY TESTED METHOD FOR MEASURING URANIUM IN AIR
 10/78 -COLLABORATIVELY TESTED METHOD FOR MEASURING URANIUM IN SOIL
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: REC-002957 SSIE-GMA 40B3 EPA -D7-0015 TASK-J625C-67
 AP -625C DU -N140 LABT-MTS

ABSTRACT.....: OBJECTIVE: CONDUCT RESEARCH ON THE DEVELOPMENT OF TECHNIQUES TO MONITOR POTENTIALLY HAZARDOUS EFFLUENTS AND EMISSIONS FROM NUCLEAR FUEL CYCLE FACILITIES. APPROACH: DEVELOP OR EVALUATE METHODS FOR MONITORING PLUTONIUM IN WATER, URANIUM IN WATER, SOIL AND AIR, AND AMERICIUM IN SOIL. RECOMMEND METHODS WHICH BEST MEET ESTABLISHED CRITERIA AND CONDUCT AND EVALUATE RESULTS OF INTERLABORATORY COLLABORATIVE TESTS OF THESE METHODS. THIS INCLUDES THE DEVELOPMENT OF APPROPRIATE REFERENCE MATERIALS FOR CALIBRATION AND ANALYSIS. OUTPUTS: METHODS FOR MEASURING PLUTONIUM IN WATER AND URANIUM IN WATER HAVE BEEN COLLABORATIVELY TESTED. EFFORTS ARE UNDERWAY TO DEVELOP AND EVALUATE METHODS FOR AMERICIUM IN SOIL AND URANIUM IN SOIL AND AIR.

****PROJECT: 02959-ENERGY-RELATED RADIOLOGICAL MONITORING QUALITY ASSURANCE**

STARTING/ COMPLETION DATE : 00/75 - 10/77 : FUNDING : ESTIMATED - FY77 / \$ 40000
 TASK CODE=J625C-68 **EPA= ** (IN-HO) PRIOR FY76 / \$ 188000
 IN-HOUSE EFFORT : FY 77 / 02.0 YEARS : TOTAL PROJECT 05.0
 EPA OFFICER.: AN JARVIS EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: LH ZIEGLER US EPA
 MILESTONES....: 04/77 -DETERMINATION OF THE POTENTIAL RADIOACTIVE POLLUTANTS FOR WHICH Q
 05/77 -PRODUCTION OF RADIUM-228 STANDARDS AND CONTINUING TRACEABILITY ST
 00/00 -LABORATORY INTERCOMPARISON STUDIES
 10/76 -PUBLICATION OF GUIDELINE DESCRIBING CALIBRATION PROCEDURES FOR GA
 11/76 -PUBLICATION OF A GUIDELINE ON THE PREPARATION AND USE OF RADIATIO
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: REC-002959 SSIE-ZMA 1059 TASK-J625C-68 AP -625C
 DU -N140 LABT-MTS

ABSTRACT.....: OBJECTIVE: THE OBJECTIVE IS TO DETERMINE THE POTENTIAL RADIOACTIVE POLLUTANTS FOR WHICH QUALITY CONTROL STANDARDS, SRM'S, AND PROCEDURES WILL BE NEEDED AS THE RESULT OF EXPANDED NUCLEAR POWER, FOSSIL-FUEL EXTRACTION, AND GEOTHERMAL ACTIVITIES AND TO SUPPLY THESE STANDARDS, SRM'S AND PROCEDURES TO INTERESTED LABORATORIES. APPROACH: A REPORT, "POTENTIAL RADIOACTIVE POLLUTANTS RESULTING FROM EXPANDED ENERGY PROGRAMS," WAS PREPARED FOR THE EPA THROUGH A CONTRACTUAL AGREEMENT. BASED ON THE RESULTS OF THIS REPORT, STANDARD REFERENCE MATERIALS AND CALIBRATED SAMPLES, REQUIRED FOR THE ANALYSIS OF SAMPLES OBTAINED BY MONITORING ACTIVITIES IN THE VICINITY OF NUCLEAR FACILITIES, FOSSIL-FUEL EXTRACTION AND UTILIZATION ACTIVITIES, AND GEOTHERMAL SITES, ARE BEING DEVELOPED. OUTPUTS: LABORATORY INTERCOMPARISON STUDIES HAVE CONTINUED. STANDARDS, INCLUDING RADIUM-228, HAVE BEEN MADE AVAILABLE TO LABORATORIES UPON REQUEST. SEVERAL GUIDELINES, INCLUDING USE OF RADIATION STANDARDS AND GAMMA MEASUREMENTS TECHNIQUES, HAVE BEEN PREPARED.

****PROJECT: 02981-DEVELOPMENT OF BACKGROUND EVALUATIONS FOR VALIDATIONS OF GROUNDWATER QUALITY MONITORING METHODOLOGY**

STARTING/ COMPLETION DATE : 07/77 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 0
 TASK CODE=J625C-69 **EPA=68-03-2564 ** (CNTR.) PRIOR FY77 / \$ 55000
 EPA OFFICER.: LG MCILLION EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: J MULLICAN STATE WATER QUALITY BOARD GEOLOGICAL SERVS
 MILESTONES....: 12/77 -DETERMINE AND DESCRIBE THE HYDROGEOLOGY AND GROUND WATER USE
 02/78 -INVENTORY POLLUTION SOURCES AND IDENTIFY POTENTIAL POLLUTANTS
 04/78 -COLLECT AND ANALYZE EXISTING GROUND WATER QUALITY DATA
 10/78 -REPORT ON EVALUATION OF GROUND WATER DATA INTERPRETED WITH RESPE
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: RECN-002961 SSIE-GMA 4095 EPA -68-03-2564 TASK-J625C-69
 AP -625C DU -N140 LABT-MTS

ABSTRACT.....: OBJECTIVES: THIS PROJECT FOCUSES C) THE FIELD VALIDATION OF A RESEARCH-DEVELOPED METHODOLOGY FOR MONITORING CHANGES IN GROUNDWATER QUALITY PRESENTED IN THE REPORT "MONITORING GROUNDWATER QUALITY: MONITORING METHODOLOGY." BY APPLYING THE METHODOLOGY TO A REGION RELATED TO ENERGY DEVELOPMENT, AN EARLY APPRAISAL CAN BE MADE OF THE IMPACT THESE ACTIVITIES MAY HAVE ON THE ENVIRONMENT. APPROACH: THE STUDY AREA SELECTED FOR THIS FIELD VALIDATION IS 17 COUNTIES IN THE EASTERN PART OF TEXAS WHICH CONTAIN ENORMOUS AND WIDESPREAD QUANTITIES OF LIGNITE AND SOME OF THE NATION'S LARGEST OIL FIELDS. A SERIES OF PROCEDURAL STEPS DESIGNED TO LEAD TO A PROGRAM TO MONITOR GROUNDWATER-QUALITY DETERIORATION RESULTING FROM MAN'S ACTIVITIES ARE AS FOLLOWS: STEP 1 - SELECT AREA OR BASIN FOR MONITORING; STEP 2 -IDENTIFY POLLUTION SOURCES, CAUSES, AND METHODS OF WASTE DISPOSAL; STEP 3 - IDENTIFY POTENTIAL POLLUTANTS; STEP 4 - DEFINE GROUNDWATER USAGE; STEP 5 - DEFINE HYDROGEOLOGIC SITUATION; AND STEP 6 - STUDY EXISTING GROUNDWATER QUALITY AND DESCRIBE THE EXISTING MONITORING PROGRAM. COMPLETION OF THESE STEPS WILL PROVIDE THE BACKGROUND INFORMATION NEEDED TO SELECT MORE LOCALIZED DEMONSTRATION SITES TO BE INCLUDED IN FUTURE EPA PROJECTS TO VERIFY THE REMAINDER OF THE MONITORING METHODOLOGY. OUTPUTS: CONTRACT WORK INITIATED AT THE TIME OF THIS REPORT. CONTRACT REPORTING SCHEDULE IS AS FOLLOWS: DETERMINE AND DESCRIBE THE HYDROGEOLOGY AND GROUNDWATER USE (12/77); INVENTORY POLLUTION SOURCES AND IDENTIFY POTENTIAL POLLUTANTS (2/78); COLLECT AND ANALYZE EXISTING GROUNDWATER-QUALITY DATA (4/78); REPORT ON EVALUATION OF GROUNDWATER DATA INTERPRETED WITH RESPECT TO HYDROGEOLOGY AND POLLUTION SOURCE (10/78).

****PROJECT: 02983-ACQUIRE FROM NASA AND PUT INTO USE, THE DATA ANALYSIS SYSTEM (DAS) FOR MULTISPECTRAL INFORMATION**

STARTING/ COMPLETION DATE : 10/76 - 00/77 : FUNDING : ESTIMATED - FY77 / \$ 40000
 TASK CODE=J625C-70 **EPA= ** (IN-HO) PRIOR FY76 / \$ 200000
 IN-HOUSE EFFORT : FY 77 / 00.5 YEARS : TOTAL PROJECT
 EPA OFFICER.: M DOCKTER EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: M DOCKTER US EPA/ORD EMSL/REN MON METH BR
 MILESTONES....: 09/66 -DEMONSTRATION OF TECHNIQUE
 07/77 -TRAINING EMSL-LV PERSONNEL
 09/77 -ACQUIRE COMPLETE DAS FOR EMSL-LV
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: RECN-002963 SSIE-ZMA 1102 TASK-J625C-70 AP -625C
 DU -N140 LABT-MTS

ABSTRACT.....: OBJECTIVES: A) TRAINING OF EMSL-LV REMOTE SENSING DIVISION PERSONNEL BY NASA IN THE USE OF THE AUTOMATED MULTISPECTRAL ANALYSIS SYSTEM. B) ACQUIRE FROM NASA AND PUT INTO OPERATIONAL USE THE DATA ANALYSIS SYSTEM. C) PERFORM ANALYSIS AND PREPARE A FINAL REPORT ON COMPLETION OF THE TRANSFER OF TECHNOLOGY. APPROACH: THE TRAINING OF EMSL-LV REMOTE SENSING DIVISION PERSONNEL ON THE ACTUAL DAS WITH OPERATIONAL TYPE REQUIREMENTS WILL GREATLY ENHANCE THE NASA TO EPA TECHNOLOGY TRANSFER. THE DAS WAS DESIGNED WITH THE CAPABILITY TO REDUCE A BROAD RANGE OF REMOTE SENSOR DATA AND WILL BE USED TO REDUCE THE MULTISPECTRAL SCANNER AND ERTS DATA FOR LAND USE MAPPING AND WATER MONITORING PURPOSES. THE DAS OUTPUT MAY BE RECORDED ON NINE TRACK DIGITAL COMPUTER COMPATIBLE TAPE FOR FURTHER PROCESSING, DISPLAYED ON A HIGH-RESOLUTION COLOR TELEVISION MONITOR, RECORDED ON 9.5 INCH WIDE COLOR OR BLACK AND WHITE FILM, OR LISTED ON A HIGH-SPEED LINE PRINTER. A VERSATILE INTERACTIVE OPERATOR CONTROL CONSOLE IS INCLUDED TO PROVIDE COMPLETE OPERATOR-PROCESSOR COMMUNICATION AND CONTROL. CURRENT PLANS/PROGRESS: A) DEMONSTRATION OF TECHNIQUE USING EXISTING NASA SYSTEM (COMPLETE). B) TRAINING OF EMSL-LV PERSONNEL (OCTOBER 1976 TO JULY 1977). 3) ACQUIRE COMPLETE DAS SYSTEM FOR EMSL-LV (JUNE 1976 TO SEPTEMBER 1977).

****PROJECT: 02984-ENERGY-RELATED OVERHEAD MONITORING AND TECHNIQUES DEVELOPMENT**

STARTING/ COMPLETION DATE : 00/75 - 00/81 : FUNDING : ESTIMATED - FY77 / \$ 58000
 TASK CODE=J625C-71 **EPA= ** (IN-HQ) PRIOR FY76 / \$ 100000
 IN-HOUSE EFFORT : FY 77 / 01.0 YEARS ; TOTAL PROJECT 05.0
 EPA OFFICER.: R LANDERS EPA/EMSL - LAS VEGAS EMSL/REM MON METH BR
 INVESTIGATOR.: R LANDERS US EPA/ORD
 MILESTONES...: 08/76 -BASELINE STUDIES
 08/76 -DEMONSTRATION OF TECHNIQUE
 08/76 -ASSESS ENVIRONMENTAL IMPACT
 12/76 -UTILIZE DS-1260 MULTISPECTRAL SCANNER
 01/77 -PREPARE REPORT
 01/77 -PREPARE ATLAS
 06/77 -COMPLETE EVALUATION REPORT
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: RECN-002964 SSIE-ZMA 1103 TASK-J625C-71 AP -625C
 DU -N140 LABT-MTS
 ABSTRACT.....: OBJECTIVE: ESTABLISH PRELIMINARY GUIDELINES FOR AND DEMONSTRATION OF OVERHEAD REMOTE MONITORING OF WESTERN ENERGY-RELATED ACTIVITIES. APPROACH: COOPERATIVE WESTERN ENERGY-RELATED OVERHEAD MONITORING PROGRAM BETWEEN NASA AND EPA HAS BEEN ESTABLISHED WITH THE PURPOSE TO DEFINE, DEMONSTRATE AND DEVELOP OPERATIONAL REMOTE SENSOR TECHNIQUES TO RAPIDLY MONITOR, IN A COST-EFFECTIVE, QUANTITATIVE MANNER, THE SUCCESS WITH WHICH AN ENERGY-RELATED EXTRACTION SITE HAS BEEN OR IS BEING REHABILITATED TO A STATE SUITABLE FOR ITS INTENDED OR PREVIOUS LAND USAGE. THIS INCLUDES THE DETERMINATION OF ENVIRONMENTAL BASELINES FOR THE PURPOSE OF ESTABLISHING REHABILITATION CRITERIA AS WELL AS ENVIRONMENTAL EFFECTS OF MINE MOUTH POWER PLANTS. CURRENT PLANS/PROGRESS: A) INITIATE BASE LINE INFORMATION STUDIES (COMPLETED), B) DEMONSTRATION OF MULTISPECTRAL SCANNER TECHNIQUES USING EXISTING NASA SYSTEM (COMPLETED), C) UTILIZING MANUAL PHOTOINTERPRETATION TECHNIQUES OF AERIAL PHOTOGRAPHS, PERFORM ASSESSMENTS OF ENVIRONMENTAL IMPACT AND REHABILITATION EFFORTS (AUGUST 1975 AUGUST 1976), D) UTILIZING MULTISPECTRAL SCANNER (MSS) DATA, PERFORM ASSESSMENT OF ENVIRONMENTAL IMPACT AND REHABILITATION EFFORTS (8/75-9/76), E) PHOTOINTERPRETATION REPORT PREPARATION (8/76-9/76), F) MSS DATA REPORT PREPARATION (12/76-1/77), G) PREPARE WESTERN ENERGY "ATLAS" (8/76-12/76), H) EVALUATION REPORT (1/77-6/77).

****PROJECT: 02986-DEVELOPMENT OF TECHNIQUES FOR REMOTE MONITORING OF ORGANIC POLLUTION IN SURFACE WATERS**

STARTING/ COMPLETION DATE : 00/75 - 00/81 : FUNDING : ESTIMATED - FY77 / \$ 39300
 TASK CODE=J625C-72 **EPA= ** (IN-HQ) PRIOR FY76 / \$ 76000
 IN-HOUSE EFFORT : FY 77 / 01.0 YEARS ; TOTAL PROJECT 06.0
 EPA OFFICER.: M BRISTOW EPA/EMSL - LAS VEGAS EMSL/REM MON METH BR
 INVESTIGATOR.: M BRISTOW US EPA/ORD
 MILESTONES...: 09/77 -FEASIBILITY REPORT ON ORGANIC CARBON LASER FLUORESENSOR
 01/79 -DESIGN AND CONSTRUCT CARBON LASER FLUORESENSOR
 01/81 -DESIGN, CONSTRUCT, TEST AND REPORT ON ADVANCE SYSTEM
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: RECN-002966 SSIE-ZMA 1062 TASK-J625C-72 AP -625C
 DU -N140 LABT-MTS
 ABSTRACT.....: OBJECTIVE: THE ULTIMATE OBJECTIVE OF THIS PROGRAM IS TO DEVELOP AN ACTIVE AIRBORNE MONITORING SYSTEM CAPABLE OF PROVIDING QUANTITATIVE DATA ON THE CONCENTRATION OF TOTAL ORGANICS IN SURFACE WATERS. APPROACH: THE PRINCIPLE EMPLOYED IS AN EXTENSION OF THE LABORATORY TECHNIQUE OF SPECTROFLUOROMETRY. A WATER SAMPLE IS IRRADIATED WITH ULTRAVIOLET (UV) LIGHT OF A SPECIFIC WAVELENGTH AND INTENSITY, AND THE RESULTANT FLUORESCENCE EMISSION IS THEN MONITORED USING A MONOCHROMATOR-MULTICHANNEL DETECTOR COMBINATION. THE FLUORESCENCE SIGNAL ARISES FROM DISSOLVED ORGANIC MATERIALS BOTH MAN-MADE AND NATURAL IN ORIGIN RATHER THAN FROM THE WATER ITSELF, WHICH DOES NOT FLUORESCENCE. HOWEVER, THE WATER MOLECULE EMITS A RAMAN BAND WHICH, FOR VERY DILUTE AQUEOUS SOLUTIONS OF ORGANICS, HAS A CONSTANT AMPLITUDE FOR A GIVEN INTENSITY OF EXCITATION RADIATION. THIS WATER RAMAN EMISSION BAND IS THEN CONVENIENTLY EMPLOYED AS A BUILT-IN REFERENCE SOURCE WITH WHICH TO COMPARE THE AMPLITUDE OF THE CONCURRENT FLUORESCENCE EMISSION. THE NORMALIZED AMPLITUDE OF THE SIGNAL THEN PROVIDES INFORMATION CONCERNING THE CONCENTRATION OF THE DISSOLVED ORGANICS. CURRENT PLANS: A NUMBER OF REPORTS HAVE BEEN PUBLISHED RECENTLY WHICH INDICATE THAT THE UV-INDUCED FLUORESCENCE EMISSION IS PROPORTIONAL TO THE CONCENTRATION OF DISSOLVED ORGANIC CARBON. IT IS PLANNED TO EXPLORE THIS RELATIONSHIP IN MORE DETAIL WITH THE PURPOSE OF ESTABLISHING A FIRM VALUE FOR A CORRELATION COEFFICIENT. BASED ON THE FINDINGS OF THIS CORRELATION STUDY, AN AIRBORNE LASER FLUORESENSOR WILL BE DESIGNED, BUILT AND TESTED. THIS SYSTEM WILL HAVE THE CAPABILITY OF CONTINUOUSLY MONITORING AND RECORDING THE DISSOLVED ORGANIC CARBON CONCENTRATION FOR THE SURFACE WATER BELOW THE AIRCRAFT.

****PROJECT: 02967-ENERGY RELATED WATER MONITORING DATA INTEGRATION**

STARTING/ COMPLETION DATE : 00/75 - 00/80 : FUNDING : ESTIMATED - FY77 / \$ 84000
 TASK CODE=J625C-73 **EPA= ** (IN-HO) PRIOR FY76 / \$ 177000
 IN-HOUSE EFFORT : FY 77 / 03.0 YEARS : TOTAL PROJECT 15.0
 EPA OFFICER.: VW LAMBOU EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: R THOMAS US EPA
 VW LAMBOU US EPA
 MILESTONES....: 06/76 -PUBLICATION OF WESTERN ENERGY MONITORING ATLAS
 12/77 -ENERGY RESOURCE DEVELOPMENT IMPACT-SAN JUAN BASIN, UTAH, COLORADO
 03/78 -WESTERN ENERGY RESOURCE DEVELOPMENT, BASELINE DATA & LONG TERM WA
 06/78 -ENERGY RESOURCE DEVELOPMENT IMPACT - POWDER RIVER BASIN
 07/78 -ENERGY RESOURCE DEVELOPMENT IMPACT - TONGUE RIVER BASIN
 08/78 -ENERGY RESOURCE DEVELOPMENT IMPACT - LITTLE MISSOURI RIVER BASIN
 09/78 -ENERGY RESOURCE DEVELOPMENT IMPACT - BELLE FORCHE RIVER
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: RECN-002967 SSIE-ZMA 1056 TASK-J625C-73 AP -625C
 DU -N140 LABT-MTS
 ABSTRACT.....: OBJECTIVE: ESTABLISH A WATER MONITORING NETWORK THROUGHOUT THE WESTERN STATES TO MONITOR AND ASSESS
 THE IMPACT OF ENERGY RESOURCE DEVELOPMENT. APPROACH: THROUGH THE USE OF COMPUTER DATA BANKS.
 PRIMARILY STORED, WATER MONITORING STATIONS THAT ARE CURRENTLY IN OPERATION, BACK PAST 1970, AND
 HAVE REPORTED A LARGE NUMBER OF MEASURED PARAMETERS WERE SELECTED FOR INCORPORATION INTO A PRIMARY
 MONITORING NET. PARAMETERS OF INTEREST WERE IDENTIFIED AND A QUALITY ASSURANCE PROGRAM IS BEING
 ESTABLISHED IN PARTICIPATING LABORATORIES. HISTORICAL DATA HAVE BEEN REVIEWED AND BASELINE WATER
 QUALITY CONDITIONS ARE BEING ESTABLISHED. A WESTERN ENERGY RESOURCES ATLAS HAS BEEN PUBLISHED IN
 CONJUNCTION WITH A SIMILAR EFFORT ON AIR MONITORING. OUTPUTS: DATA FROM THE PRIMARY NET STATIONS IS
 BEING AUGMENTED WITH DATA FROM OTHER STATIONS. AN ASSESSMENT OF BASELINE WATER QUALITY, TRENDS, AND
 IMPACTS ON A BASIN BY BASIN BASIS IS UNDERWAY. AS DATA GAPS, EITHER DESIRED PARAMETERS, SAMPLING
 FREQUENCY, OR ADDITIONAL STATIONS ARE IDENTIFIED, ACTIONS WILL BE TAKEN WITH APPROPRIATE EPA
 REGIONAL OFFICES OR OTHER GOVERNMENTAL AGENCIES TO CORRECT THEM. THE PRIMARY NET WILL BE UPDATED
 PERIODICALLY AND EXTENDED INTO AREAS NOT PRESENTLY ADDRESSED.

****PROJECT: 02969-FOUR CORNERS AMBIENT AIR MONITORING NETWORK**

STARTING/ COMPLETION DATE : 11/75 - 09/80 : FUNDING : ESTIMATED - FY77 / \$ 175000
 TASK CODE=J625C-74 **EPA=68-03-2345 ** (CNTR.) PRIOR FY76 / \$ 425000
 EPA OFFICER.: DN MCNELIS EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: DN MCNELIS UTE RES LABS
 DN MCNELIS US EPA
 MILESTONES....: 01/76 -NETWORK OPERATIONAL
 06/77 -SULFATE NITRATE ANALYSIS OPERATIONAL
 12/77 -ANNUAL REPORT - DATA SUMMARY
 12/78 -ANNUAL REPORT - DATA SUMMARY
 12/79 -ANNUAL REPORT - DATA SUMMARY
 12/80 -ANNUAL REPORT - DATA SUMMARY
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: RECN-002969 SSIE-GMA 4072 EPA -68-03-2345 TASK-J625C-74
 AP -625C DU -N140 LABT-MTS
 ABSTRACT.....: OBJECTIVES: MAINTAIN AN AIR QUALITY MONITORING NETWORK IN THE FOUR CORNERS AREA TO EVALUATE THE
 PRESENT AND FUTURE AIR QUALITY IMPACT OF ENERGY-RELATED DEVELOPMENTS IN THE WESTERN UNITED STATES.
 INTEGRATE THE AIR QUALITY MONITORING DATA COLLECTED BY THIS NETWORK WITH DATA COLLECTED ELSEWHERE.
 APPROACH: A 28-STATION HI-VOL NETWORK IS OPERATED OVER THE FOUR CORNERS REGION. A 24-HOUR SAMPLE IS
 COLLECTED THREE TIMES PER WEEK. EACH SAMPLE IS ANALYZED FOR TRACE ELEMENTS (PB, CR, CU, NI, FE, AND
 CD), SULFATE NITRATE, AND TOTAL SUSPENDED PARTICULATES. ALL DATA ARE ENTERED INTO THE EPA SAROAD
 SYSTEM. OUTPUTS: ANNUAL SUMMARY OF DATA. QUARTERLY PROGRESS REPORTS.

****PROJECT: 02971-ENERGY-RELATED AMBIENT AIR QUALITY MONITORING IN THE WESTERN ENERGY DEVELOPMENT AREA**

STARTING/ COMPLETION DATE : 07/75 - 09/80 : FUNDING : ESTIMATED - FY77 / \$ 230000
 TASK CODE=J625C-75 **EPA= ** (IN-HO) PRIOR FY76 / \$ 290000
 IN-HOUSE EFFORT : FY 77 / 04.0 YEARS : TOTAL PROJECT 20.0
 EPA OFFICER.: RN SNELLING EPA/EMSL - LAS VEGAS
 INVESTIGATOR.: RN SNELLING US EPA
 MILESTONES....: 06/77 -ENERGY ATLAS (INVENTORY)
 10/77 -AIRCRAFT MONITORING OPERATIONAL
 12/77 -ANNUAL REPORT SUMMARIZING GROUND-BASED AND AIRBORNE SAMPLING DATA
 12/78 -ANNUAL REPORT SUMMARIZING GROUND-BASED AND AIRBORNE SAMPLING DATA
 12/79 -ANNUAL REPORT SUMMARIZING GROUND-BASED AND AIRBORNE SAMPLING DATA
 12/80 -ANNUAL REPORT SUMMARIZING GROUND-BASED AND AIRBORNE SAMPLING DATA
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: RECN-002971 SSIE-ZMA 1053 TASK-J625C-75 AP -625C
 DU -N140 LABT-MTS
 ABSTRACT.....: OBJECTIVE: PROVIDE INTEGRATED AND VALIDATED AIR QUALITY MONITORING DATA (BASE LINE AND TREND) FOR
 THE WESTERN AREA OF THE U.S. WHICH ARE OR WILL BE IMPACTED BY ENERGY-RELATED DEVELOPMENT
 ACTIVITIES. THE GEOGRAPHIC COVERAGE INCLUDES THE NORTHERN GREAT PLAINS, FOUR CORNERS AREA, COLORADO
 PLATEAU (OIL SHALE), BLACK MESA, ARIZONA, AND AREAS OF NEW MEXICO. APPROACH: 1. MAINTAIN INVENTORY
 OF EXISTING AND PROJECTED POLLUTION SOURCES AND MONITORING NETWORKS. 2. INTEGRATE AIR QUALITY
 MONITORING DATA AND ASSESS IMPACT OF ENERGY-RELATED ACTIVITIES. 3. CONDUCT AIRCRAFT AIR QUALITY
 MONITORING MISSIONS TO SUPPLEMENT GROUND-BASED NETWORK DATA. OUTPUTS: 1. ANNUAL REPORTS OF
 GROUND-BASED MONITORING DATA; 2. ANNUAL REPORTS OF AIRBORNE MONITORING DATA.

****PROJECT: 04121-OCEAN OIL SPILL CONCENTRATION AND TRAJECTORY FORECAST**

STARTING/ COMPLETION DATE : 07/75 - 12/79 : FUNDING : ESTIMATED - FY77 / \$ 170000
 TASK CODE=V625C-10 **EPA=D5-E693-DY ** (IAG) PRIOR FY76 / \$ 388000

EPA OFFICER.: GJ D'ALESSIO EPA/HDOQTRS- OEMI
 INVESTIGATOR.: CS BARRIENTOS US DOC NATL OCEANIC & ATMOSPHERIC ADMIN
 KW HESS US DOC NATL OCEANIC & ATMOSPHERIC ADMIN
 L BURROUGHS US DOC TECHNIQUES DEV LAB
 AD TAYLOR US DOC

MILESTONES.... 09/78 -PROGRESS REPORT ON OIL SPILL TRAJECTORY MODEL
 PLAN ID..... (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES... RECN-004121 SSIE-GMA 4651 EPA -D5-E693-DY TASK-V625C-10
 AP -625C DU -N140 LABT-EMI

ABSTRACT..... THE OBJECTIVE OF THIS PROGRAM IS TO DEVELOP AN OIL SPILL TRAJECTORY MODEL AND TO IMPLEMENT THE MODEL IN THE NATIONAL WEATHER SERVICE, NOAA. THE MODEL WILL BE USED IN AN OPERATIONAL MODE DURING OIL SPILL EPISODES. IT WILL ALSO BE USED WITH CLIMATOLOGICAL DATA FOR COASTAL IMPACT DETERMINATION AND ASSESSMENT. THE PROGRAM INCLUDES PROVISIONS TO DEVELOP TECHNIQUES FOR FORECASTING CURRENT, WIND, AND WAVE FIELDS THAT HAVE NOT PREVIOUSLY BEEN AVAILABLE. A LARGE PORTION OF THE EFFORT IS ON METEOROLOGICAL MODELINGS TO GET THE PROPER ATMOSPHERIC FORCINGS FOR THE OCEANIC MODELS. A REGIONAL ATMOSPHERIC MODEL IS BEING DEVELOPED. THE PROGRAM IS DIVIDED INTO FIVE PROCESSES AND MANAGEMENT TASKS: 1) WEATHERING, 2) SPREADING, 3) DIFFUSION, 4) TRANSPORT, AND 5) MODEL INTEGRATION. SIX CONTRACTS HAVE BEEN AWARDED; TWO WERE COMPLETED AND ONE WAS RENEWED. WE HAVE COMPLETED PROGRAMMING A SPREADING DIFFUSION MODEL AND HAVE PERFORMED VARIOUS EXPERIMENTS. A METEOROLOGICAL ANALYSIS PROGRAM HAS BEEN ADAPTED FOR THE U.S. EAST COAST. WE ARE DEVELOPING A DYNAMIC MODEL TO COMPUTE WATER TRANSPORT FOR THE CASE OF STRONG BAROMETRIC AND WIND FORCINGS OVER SHALLOW SHELVES. WE ARE USING OIL SPILL DATA (E.G. ARGO MERCHANT) TO DERIVE MODEL PARAMETERS. WE WILL CONTINUE DEVELOPMENT OF ATMOSPHERIC AND OCEANIC MODELS FOR USE IN DETERMINING OIL SPILL TRAJECTORIES. RESULTS OF CONTRACT PROJECTS WILL BE INTEGRATED IN THE MODELING AS SOON AS THEY BECOME AVAILABLE. A PROGRESS REPORT OF THE PROGRAM IS DUE IN SEPTEMBER 1978.

****PROJECT: 04123-STANDARDIZATION AND INTERCALIBRATION TECHNIQUES FOR MARINE MONITORING**

STARTING/ COMPLETION DATE : 07/75 - 12/79 : FUNDING : ESTIMATED - FY77 / \$ 250000
 TASK CODE=V625C-12 **EPA=D5-E693-EA ** (IAG) PRIOR FY76 / \$ 562000

EPA OFFICER.: GJ D'ALESSIO EPA/HDOQTRS- OEMI TEST & EVALUATION LAB
 INVESTIGATOR.: M BASILEO US DOC

MILESTONES.... 12/78 -DEVELOP CTD SENSING SYSTEM FIELD VERIFICATION STANDARDS
 PLAN ID..... (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES... RECN-004123 SSIE-GMA 2984 1 EPA -D5-E693-EA TASK-V625C-12
 AP -625C DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVE: TO DEVELOP TECHNIQUES FOR THE STANDARDIZATION AND INTERCALIBRATION OF MARINE WATER QUALITY MEASUREMENTS (IN SITU, SAMPLING AND ANALYTICAL METHODOLOGIES) SUCH THAT THE UNCERTAINTY LEVELS OF THE MEASUREMENTS CAN BE DEFINED IN RELATION TO ACCEPTED STANDARDS. APPROACH: DEVELOP LABORATORY, TRANSFER AND FIELD STANDARDS FOR SELECTED MARINE WATER QUALITY PARAMETERS TO SERVE AS A BASIS FOR ESTABLISHING MEASUREMENT UNCERTAINTY LEVELS; INVESTIGATE THE COMPARABILITY OF RESULTS BETWEEN ACCEPTED ANALYTICAL CHEMISTRY TECHNIQUES AND MORE RECENTLY DEVELOPED IN SITU MEASUREMENT METHODS; DETERMINE THE COMPARABILITY OF RESULTS BETWEEN ACCEPTED ANALYTICAL TECHNIQUES DEVELOPED FOR FRESHWATER AND METHODS CURRENTLY USED IN ANALYSIS OF ESTUARINE AND SEA WATER. PROGRESS/PLANS: LABORATORY DISSOLVED OXYGEN STANDARD, CTD AND PRECISION PRESSURE TRANSFER STANDARDS ARE UNDER DEVELOPMENT; INVESTIGATIONS INTO THE COMPARABILITY OF WATER QUALITY "TEST KITS" AND SALINE WATER ANALYTICAL METHODS TO ACCEPTED ANALYTICAL METHODS HAS BEEN CONTRACTED. THE DEVELOPMENT OF A FIELD VERIFICATION STANDARD FOR CTD SENSING SYSTEMS WILL BE UNDERTAKEN DURING FY 1978.

****PROJECT: 04125-BYPRODUCT MARKETING**

STARTING/ COMPLETION DATE : 05/75 - 10/79 : FUNDING : ESTIMATED - FY77 / \$ 150000
 TASK CODE=V625C-15 **EPA=D7-E721-BJ ** (IAG) PRIOR FY76 / \$ 700000

EPA OFFICER.: GJ D'ALESSIO EPA/HDOQTRS- OEMI
 INVESTIGATOR.: WE OBRIEN US TVA
 WL ANDERS US TVA

MILESTONES.... 03/76 -INTERIM REPORT ON STUDY PUBLISHED, REPORT, S-469
 10/77 -FINAL REPORT ON ABATEMENT PRODUCTION OF H2SO4 SUBMITTED TO EPA
 10/77 -FINAL REPORT ON ABATEMENT PRODUCTION OF GYPSUM
 01/78 -FINAL REPORT ON GYPSUM PRODUCTION TO EPA

PLAN ID..... (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES... RECN-004125 SSIE-GMA 4677 EPA -D7-E721-BJ TASK-V625C-15
 AP -625C DU -N140 LABT-EMI

ABSTRACT..... THE OBJECTIVES OF THIS STUDY ARE TO ESTIMATE THE COSTS AND QUANTITIES OF ABATEMENT BYPRODUCTS WHICH COULD BE PRODUCED WITH AIR POLLUTION ABATEMENT PROCESSES INSTALLED AT POWER PLANTS; TO DETERMINE THE COMPETITIVE COSTS OF EXISTING/PLANNED PRODUCTION PROCESSES THAT THE ABATEMENT BYPRODUCTS COULD LOGICALLY REPLACE; AND TO MODEL AN OPTIMUM DISTRIBUTION SYSTEM OF THE POWER PLANTS POTENTIALLY PRODUCING ABATEMENT BYPRODUCTS, THE POTENTIAL PURCHASERS OF THE ABATEMENT BYPRODUCTS, AND THE TRANSPORTATION CONNECTIONS BETWEEN THEM. A SYSTEMS APPROACH IS USED FOR THE PROJECT. REFINEMENT, VERIFICATION, DOCUMENTATION, CONSISTENCY WITH ENGINEERING CALCULATIONS, AND DETAILED ANALYSIS OF RESULTS ARE USED TO ACCOMPLISH PROJECT OBJECTIVES. A FINAL REPORT HAS BEEN SUBMITTED TO EPA, AND WORK IS CONTINUING TO DEVELOP A USER MANUAL FOR USE OF THE AUTOMATED SYSTEM DEVELOPED DURING THE PROJECT.

****PROJECT: 04126-DEVELOP A SOFTWARE MODULE WHICH REMOVES GEOMETRIC DISTORTIONS FROM AIRCRAFT MULTISPECTRAL CLASSIFIED DATA**

STARTING/ COMPLETION DATE : 04/77 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 20000
TASK CODE=V625C-16 **EPA-D5-E771 ** (IAG) PRIOR FY /

EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
INVESTIGATOR.: AT JOYCE US NASA
W STONEY US NASA
EL TILTON US NASA

MILESTONES....: 10/77 -SOFTWARE DEVELOPMENT
06/78 -FINAL REPORT

PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.

ORDIS CODES...: REC-004126 SSIE-GMA 4673 EPA -D5-E771 TASK-V625C-16
AP -625C DU -N140 LABT-EMI

ABSTRACT.....: OBJECTIVE: DEVELOP A TECHNIQUE OF RESAMPLING THE MULTISPECTRAL AIRCRAFT DATA SO THAT MOST GEOMETRIC DISTORTIONS ARE REMOVED AND THE DATA ARE REGISTERED TO THE U.T.M. GRID. THIS TECHNIQUE IS TO BE INCORPORATED INTO A COMPUTER SOFTWARE MODULE THAT CAN BE ADAPTED TO THE EPA/EMSL COMPUTER SYSTEM. TECHNICAL APPROACH: THE SOFTWARE MODULE WILL BASICALLY CONSIST OF TWO COMPUTER PROGRAMS. THE FIRST PROGRAM WILL ACCEPT AS INPUTS GROUND CONTROL POINTS AND OTHER PARAMETERS SUCH AS BOUNDARIES OF THE AREA TO BE RESAMPLED AND CELL SIZE TO BE USED. THE OUTPUTS WILL BE MAPPING COEFFICIENTS WHICH WILL BE ACCEPTED BY THE SECOND PROGRAM WHICH WILL ACTUALLY DO THE RESAMPLING AND OUTPUT THE GEOGRAPHICALLY CORRECTED DATA. THE MAPPING COEFFICIENTS, WHICH ARE BASED ON CONTROL POINTS, WILL BE USED TO DETERMINE SCAN LINES AND ELEMENT NUMBERS AS FUNCTIONS OF EASTINGS AND NORTHINGS. THE TYPE AND NUMBER OF COEFFICIENTS TO BE USED WILL BE DETERMINED BY THE RELATIVE STABILITY OF THE AIRCRAFT PLATFORM FOR THE PARTICULAR FLIGHT. PROGRESS: TEST AIRCRAFT DATA SETS ACQUIRED AND SOFTWARE DEVELOPMENT HAS BEGUN; 06/78 FINAL REPORT.

****PROJECT: 04127-DEVELOP A DATA BASE CLASSIFICATION SYSTEM FOR DETERMINING THE REHABILITATION POTENTIALS OF SURFACE MINED LANDS**

STARTING/ COMPLETION DATE : 04/77 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 90000
TASK CODE=V625C-17 **EPA-D5-E771 ** (IAG) PRIOR FY /

EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
INVESTIGATOR.: AT JOYCE US NASA
W STONEY US NASA
EL TILTON US NASA

MILESTONES....: 06/78 -FINAL REPORT

PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.

ORDIS CODES...: REC-004127 SSIE-GMA 4672 EPA -D5-E771 TASK-V625C-17
AP -625C DU -N140 LABT-EMI

ABSTRACT.....: OBJECTIVE: DEVELOP A PROCEDURE WHICH UTILIZES BOTH LANDSAT AND ANCILLARY DATA IN SUCH A MANNER THAT A CLASSIFICATION OF VARIOUS REHABILITATION POTENTIALS CAN BE MADE. ANCILLARY DATA RELATES TO SOIL TYPE, SLOPE, ASPECT, RAINFALL, ELEVATION, TEMPERATURE, AND EVAPORATION NOT DIRECTLY ASSOCIATED WITH THE LANDSAT DATA, BUT NONETHELESS CONSIDERED AS BEING OF SIGNIFICANT IMPORTANCE TO THE OVERALL EFFECTIVENESS OF THE REHABILITATION CLASSIFICATION PROCEDURE DEVISED. TECHNICAL APPROACH: DERIVE LAND COVER INFORMATION FROM LANDSAT DIGITAL DATA USING STANDARD LANDSAT COMPUTER IMPLEMENTED TECHNIQUES. ALL INFORMATION WILL BE INTEGRATED INTO A DATA BASE FILE SPECIFICALLY CONSTRUCTED FOR THE 1 DEGREE BY 1 DEGREE CAMPBELL CO., WY STUDY AREA. ALL PARAMETERS WILL THEN BE UTILIZED BY SPECIFIC APPLICATIONS SOFTWARE TO ESTIMATE THE REHABILITATION POTENTIAL FOR SITES WITHIN THE STUDY AREA. AN HIERARCHICAL SCHEME IS TO BE DEVELOPED WHICH CAN BE USED AS AN INDICATOR OF REHABILITATION POTENTIAL. PROGRESS: DIGITIZATION OF ANCILLARY PARAMETERS UNDERWAY, LANDSAT DIGITAL DATA LOCATED AND ACQUISITION IS IN PROGRESS, GROUND TRUTH AT TIME OF SATELLITE OVERPASS COMPLETE. 06/78 FINAL REPORT.

****PROJECT: 04129-UTILIZATION OF AIRCRAFT-ACQUIRED MULTISPECTRAL DATA TO MONITOR CHANGE ON SURFACE MINED LANDS**

STARTING/ COMPLETION DATE : 04/77 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 75000
TASK CODE=V625C-18 **EPA-D5-E771 ** (IAG) PRIOR FY /

EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
INVESTIGATOR.: AT JOYCE US NASA
W STONEY US NASA
EL TILTON US NASA

MILESTONES....: 06/78 -FINAL REPORT

PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.

ORDIS CODES...: REC-004129 SSIE-GMA 4662 EPA -D5-E771 TASK-V625C-18
AP -625C DU -N140 LABT-EMI

ABSTRACT.....: OBJECTIVE: TO DEVELOP A TECHNIQUE THAT WOULD ALLOW FOR THE AUTOMATED PROCESSING OF AIRCRAFT-ACQUIRED MULTISPECTRAL SCANNER DATA WITHOUT THE NECESSARY PRE-MISSION GROUND TRUTH ACTIVITIES. THIS WOULD FACILITATE THE REAL TIME PROCESSING OF THE NUMEROUS DATA SETS THAT WILL BE NECESSARY IF SURFACE MINES IN THE WESTERN U.S. ARE TO BE MONITORED ON A CONTINUAL BASIS. TECHNICAL APPROACH: AIRCRAFT-ACQUIRED (1978) MULTISPECTRAL SCANNER DATA WILL BE PROCESSED USING NASA/ERL SOFTWARE PACKAGE "SEARCH". THIS PROGRAM PERMITS THE INVESTIGATOR TO AUTOMATICALLY SCAN AN ENTIRE DATA SET, LOCATE AREAS OF HOMOGENEOUS LAND COVER (BY SPECIFYING THE MAGNITUDE OF SEVERAL STATISTICAL PARAMETERS) AND SUBSEQUENTLY CLASSIFY THE ENTIRE DATA SET BASED ON THE SELECTED AREAS, WITHOUT MANUAL SELECTION OF TRAINING SAMPLES AND THE ASSOCIATED STATISTICS DEVELOPMENT. AT THIS TIME, THE DATA WILL BE SUBJECTED TO A STRUCTURED EXPERIMENT, DURING WHICH TIME THE VARIOUS INPUT PARAMETERS WILL BE SYSTEMATICALLY ALTERED. THE RESULTS WILL BE ANALYZED AND THE RESULTS FORWARDED TO EPA/EMSL. DATA FROM 1977 WILL THEN BE ANALYZED, USING THE REFINED TECHNIQUE DEVELOPED FROM THE ABOVE EXPERIMENT. THE RESULTS OF THIS RUN WILL ALSO BE FORWARDED TO EPA/EMSL. PROGRESS: INITIAL "SEARCH" RUNS COMPLETE, STRUCTURED EXPERIMENT UNDERWAY; 1977 DATA IN HOUSE. 06/78 FINAL REPORT.

****PROJECT: 04130-SHIPBOARD ENVIRONMENTAL DATA ACQUISITION SYSTEM (SEAS)**

STARTING/ COMPLETION DATE : 00/75 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=V625C-30 **EPA-D5-E693-DZ ** (IAG) PRIOR FY76 / \$ 180000
 EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI NATL OCEANIC & ATMOSPHERIC ADMIN
 INVESTIGATOR.: RR REYNOLDS US DOC
 RR REYNOLDS US DOC
 MILESTONES.... 09/78 -COMPLETE PROTOTYPE MODEL SPECIFICATIONS
 PLAN ID..... (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES... REC-004130 SSIE-GMA 4652 EPA -D5-E693-DZ TASK-V625C-30
 AP -625C DU -N140 LABT-EMI

ABSTRACT..... THIS IS ONE OF A MULTI-PART PROJECT WHOSE SUMMARY MAY BE IDENTICAL TO OTHERS. OBJECTIVE: THE SEAS PROGRAM OBJECTIVE IS TO DEVELOP AN AUTOMATED METEOROLOGICAL/OCEANOGRAPHIC OBSERVATION SYSTEM FOR USE ON BOARD SHIPS. APPROACH: (A) DEVELOP AN ENGINEERING MODEL SEAS AND TEST IT IN AN OPERATIONAL ENVIRONMENT. (COMPLETED.) (B) DEVELOP AN AUTOMATED EXPENDABLE BATHYTHERMOGRAPH (XBT) CAPABILITY AS AN ADD-ON SENSOR TO THE SEAS SYSTEM. (ENGINEERING MODEL COMPLETED.) (C) PREPARE PROTOTYPE MODEL SEAS SPECIFICATIONS. CURRENT PROGRESS: THE ENGINEERING MODEL (SEAS-1) HAS BEEN DEVELOPED AND TESTED ON THE NOAA SHIP RESEARCHER. AN ENGINEERING MODEL AUTOMATED XBT SYSTEM WAS COMPLETED IN EARLY FY 1977 AND INTEGRATED WITH SEAS-1 FOR TESTING. CURRENT PLANS: PROTOTYPE MODEL SPECIFICATIONS WILL BE COMPLETED BY SEPTEMBER 1, 1978.

****PROJECT: 04132-ENVIRONMENTAL EFFECTS OF POLLUTANTS FROM ENERGY PRODUCTION**

STARTING/ COMPLETION DATE : 07/75 - 07/80 : FUNDING : ESTIMATED - FY77 / \$ 200000
 TASK CODE=V625C-31 **EPA-D5-3693-EG ** (IAG) PRIOR FY76 / \$ 225000
 EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: RF PUESCHEL US DOC
 PA ALLEE US DOC
 WE COBB US DOC
 FP PARUNGO US DOC
 CC VANVALIN US DOC
 DL WELLMAN US DOC

PLAN ID..... (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES... REC-004132 SSIE-GMA 4650 EPA -D5-3693-EG TASK-V625C-31
 AP -625C DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: DEVELOP CRITERIA BY WHICH TO ASSESS THE IMPACT OF POLLUTANTS FROM POWER GENERATION ON THE SOLAR AND TERRESTRIAL RADIATIVE FLUXES, AND TO DETERMINE THEIR CAPABILITY FOR ALTERING AMOUNT AND DISTRIBUTION OF PRECIPITATION THROUGH CHANGES IN THE NUMBERS OF CLOUD AND ICE NUCLEI. APPROACH: MEASURE IN SITU BY AIRCRAFT 1) NUMBER AND SIZE DISTRIBUTIONS OF PRIMARY (FLY ASH) AND SECONDARY (GAS-TO-PARTICLE CONVERTED) AEROSOLS, 2) GASES THAT LEAD TO PARTICLE FORMATION, 3) INFRARED TERRESTRIAL RADIATION, 4) ELECTRIC FIELDS AND CONDUCTIVITIES OF THE ATMOSPHERE, 5) AEROSOL LIGHT SCATTERING COEFFICIENTS. COLLECT ADDITIONAL AEROSOL SAMPLES FOR DELINEATING THE PARAMETERS THAT DETERMINE CLOUD NUCLEATING AND RADIATIVE EFFECTS, VIZ., PARTICLE SIZES, SHAPES AND ELEMENTAL COMPOSITIONS. INDEPENDENTLY DETERMINE THE CLOUD AND ICE NUCLEATING PORTION OF THE AEROSOL. CONDUCT SIMILAR MEASUREMENTS AND SAMPLE COLLECTIONS AT SELECTED SURFACE LOCATIONS. MEASURE VISIBILITIES PHOTOMETRICALLY AND BY LIGHT SCATTERING COEFFICIENT. USE MEASURED AEROSOL SIZE DISTRIBUTIONS AS INPUT INTO RADIOACTIVE TRANSFER MODELS. PROGRESS: 1. THE FOUR CORNERS, N.M. POWERPLANT DOES NOT YIELD ICE NUCLEI CONCENTRATIONS ABOVE BACKGROUND BECAUSE OF THE ADSORPTION ON FLY ASH AEROSOLS OF DEACTIVATING GASES SUCH AS SO₂ AND NO₂. HOWEVER, THEY CAN BECOME ACTIVE ICE NUCLEI IF THE GASES ARE EVAPORATED. IN THE PLUME OF THE COLSTRIP, MT., POWERPLANT, ICE NUCLEI CONCENTRATIONS OF ONE TO TWO ORDERS OF MAGNITUDE ABOVE BACKGROUND HAVE BEEN MEASURED. 2. HOMOGENEOUS AND HETEROGENEOUS NUCLEATION PROCESSES CONTRIBUTE TO CLOUD NUCLEI FORMATION AT RATES OF 10 TO THE 14TH POWER TO 10 TO THE 16TH POWER PER SECOND. 3. VARIABILITIES IN VISIBILITY OF 50 TO 250 KM HAVE BEEN OBSERVED IN EAST-CENTRAL UTAH OVER THE PERIOD OF ONE YEAR. CHANGING AEROSOL CHARACTERISTICS, AIR MASS HISTORIES AND THE EFFECTS OF CLOUDS ON CONTRAST HAVE BEEN SHOWN TO AFFECT THE VISIBILITY MEASUREMENTS. 4. INFRARED (8-14 MICRONS) PROPERTIES OF PLUME EFFLUENTS ARE TRANSMISSIVITY EQUALS 0.82 PLUS OR MINUS 0.01; EXTINCTION COEFFICIENT EQUALS 0.99 PLUS OR MINUS 0.04 KM TO THE MINUS 1; COOLING RATE EQUALS 0.64 PLUS OR MINUS 0.1 DEGREE CENTIGRADE PER HOUR.

****PROJECT: 04133-METEOROLOGICAL INTERPRETATION AND PREDICTION OF AIR QUALITY IN THE WESTERN U.S.**

STARTING/ COMPLETION DATE : 07/75 - 07/80 : FUNDING : ESTIMATED - FY77 / \$ 160000
 TASK CODE=V625C-32 **EPA-D5-E693-EK ** (IAG) PRIOR FY76 / \$ 237000
 EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: A BASS ENV RES & TECH INC
 J NUBER ENV RES & TECH INC
 PLAN ID..... (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES... REC-004133 SSIE-GMA 4663 EPA -D5-E693-EK TASK-V625C-32
 AP -625C DU -N140 LABT-EMI

ABSTRACT..... THE PURPOSE OF THE PROJECT IS TO SELECT AND APPLY A LONG DISTANCE DISPERSION MODEL TO ESTIMATE THE IMPACT OF ENERGY DEVELOPMENT IN THE FOUR CORNERS REGION OF UTAH, COLORADO, NEW MEXICO, AND ARIZONA ON THE REGIONAL AIR QUALITY AT A DISTANCE OF 100-1,000 KM FROM THE EMISSION SOURCES. A REVIEW OF EXISTING POTENTIALLY APPLICABLE MODELS WAS COMPLETED DURING FY77 AND SEVERAL MODELS WERE SELECTED FOR MODIFICATION AND EVALUATION IN FY78. THE FINALLY SELECTED MODEL OR MODELS WILL BE APPLIED TO A NUMBER OF ENERGY DEVELOPMENT SCENARIOS IN THE FOUR CORNERS REGION.

****PROJECT: 04134-ISOLATION AND IDENTIFICATION OF WATER-BORNE POLLUTANTS ASSOCIATED WITH THE POWER INDUSTRY**

STARTING/ COMPLETION DATE : 05/78 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 44000
TASK CODE=V625C-36 **EPA-D5-E721-DH ** (IAG) PRIOR FY76 / \$ 105000

EPA OFFICER.: GD D'ALESSIO EPA/HQOTRS- OEMI
INVESTIGATOR.: LH HOWE US TVA
CW HOLLEY US TVA
MILESTONES....: 07/77 -DETERMINATION BY VOLTAMMETRY OF ZN, CD, PB, CU REPORT
PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
ORDIS CODES...: RECN-004134 SSIE-GMA 2911 1 EPA -D5-E721-DH TASK-V625C-36
AP -625C DU -N140 LABT-EMI
ABSTRACT.....: LABORATORY STUDIES WILL BE MADE TO IMPROVE ANALYTICAL PROCEDURES AND PROVIDE ACCEPTABLE ALTERNATE ANALYTICAL METHODS FOR SEVERAL POLLUTANTS FROM ENERGY-CRITICAL AREAS IN THE OHIO AND TENNESSEE RIVER VALLEYS. SPECIFIC TASKS FOR WHICH IMPROVED METHODS ARE BEING DEVELOPED ARE: ACROLEIN BY VOLTAMMETRY; TOTAL ARSENIC BY VOLTAMMETRY, ATOMIC ABSORPTION AND COLORIMETRY; ZINC, CADMIUM, LEAD, AND COPPER BY VOLTAMMETRY; DIGESTION TECHNIQUES FOR SUSPENDED AND DISSOLVED METALS; CHROMIUM (III AND VI) BY VOLTAMMETRY; PROCEDURES FOR IDENTIFYING AND QUANTIFYING EXTRACTABLE ORGANIC POLLUTANTS IN SEDIMENTS; PROCEDURES FOR QUANTIFYING METALS IN FISH TISSUE. THESE REPORTS HAVE BEEN PUBLISHED: LYMAN H. HOWE, "VOLTAMMETRIC DETERMINATION OF ACROLEIN," EPA-600/7-76-005, JULY 1976 (EXCERPTS IN ANAL CHEM. 48(14), 2187, 1976); "TRACE ANALYSIS OF ARSENIC BY COLORIMETRY, ATOMIC ABSORPTION AND POLAROGRAPHY," EPA-600/7-77-038, APRIL 1977. CURRENT STATUS: DRAFT MILESTONE REPORT ON ZINC, CADMIUM, LEAD, AND COPPER BY VOLTAMMETRY WAS SUBMITTED TO EPA AUGUST 1977; LABORATORY WORK IS UNDERWAY ON DIGESTION TECHNIQUES FOR METALS AND ON CHROMIUM (III AND VI) BY VOLTAMMETRY.

****PROJECT: 04138-DEVELOPMENT AND EVALUATION OF AN INTEGRATED APPROACH TO THE OPTIMIZATION OF NUCLEAR POWER PLANT RADIOLOGICAL SURVEILLANCE PROGRAMS**

STARTING/ COMPLETION DATE : 05/75 - 09/79 : FUNDING : ESTIMATED - FY77 / \$ 127000
TASK CODE=V625C-37 **EPA-D7-E721-DI ** (IAG) PRIOR FY76 / \$ 281000

EPA OFFICER.: GD D'ALESSIO EPA/HQOTRS- OEMI
INVESTIGATOR.: EA BELVIN US TVA
BB HOBBS US TVA
LG KANJPE US TVA
RP POWERS US TVA
MILESTONES....: 04/78 -REPORT ON ENVIRONMENTAL APPLICATIONS OF GERMANIUM DETECTOR
10/78 -PROJECT TERMINATES
PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
ORDIS CODES...: RECN-004136 SSIE-GMA 4681 EPA -D7-E721-DI TASK-V625C-37
AP -625C DU -N140 LABT-EMI
ABSTRACT.....: OBJECTIVES: 1. TO DEVELOP AND MAINTAIN QUALITY ASSURANCE PROGRAM FOR RADIOLOGICAL SURVEILLANCE. THE EMPHASIS IN THIS TASK WILL BE ON DEVELOPMENT OF A MULTIPLE-LABORATORY PROGRAM. 2. TO DEVELOP IMPROVED RADIOLOGICAL MONITORING TECHNIQUES. 3. TO DEVELOP PORTIONS OF AN OPTIMIZED ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM. APPROACH: 1. TO PRODUCE AN ANALYTICAL QUALITY CONTROL DOCUMENT WHICH CAN BE USED BY RADIOLOGICAL LABORATORIES FOR QUALITY CONTROL MONITORING OF PROCEDURES, COUNTING EQUIPMENT, AND DATA HANDLING. 2. TO DEVELOP A PROGRAM OF INTERLABORATORY STUDIES, STANDARDS, AND ANALYTICAL AND COUNTING PROCEDURES TO USE AS STANDARD METHODS IN MULTIPLE LABORATORIES. 3. TO PROVIDE GUIDELINES FOR GAMMA COUNTING AND DATA REDUCTION TECHNIQUES. 4. TO DEVELOP PORTIONS OF A COST-EFFECTIVE RADIOLOGICAL SURVEILLANCE PROGRAM THROUGH THE USE OF STATISTICAL METHODOLOGIES, PARAMETRIC STUDIES AND IMPROVED SAMPLING PROCEDURES. RESULTS/STATUS: 1. A "HANDBOOK FOR ANALYTICAL QUALITY CONTROL IN RADIOANALYTICAL LABORATORIES" IS IN PRESS. 2. AN INTERLABORATORY STANDARDS AND CROSSCHECK PROGRAM HAS BEEN ESTABLISHED. 3. A REPORT, "LEAST-SQUARES RESOLUTION OF GAMMA-RAY SPECTRA IN ENVIRONMENTAL MONITORING," IS IN PRESS AND RELATES TO ANALYSIS USING NAI(TL) SYSTEMS. 4. A REPORT ON APPLICATIONS OF GERMANIUM DETECTORS IN ENVIRONMENTAL ANALYSES HAS BEEN PRODUCED IN DRAFT FORM. (EXPECTED PUBLICATION -4/78). 5. EVALUATION OF AVAILABLE SURVEILLANCE DATA AND EXISTING SURVEILLANCE PROGRAMS IS UNDERWAY.

****PROJECT: 04137-REMOTE SENSING OF SO2 EFFECTS ON VEGETATION**

STARTING/ COMPLETION DATE : 05/75 - 05/80 : FUNDING : ESTIMATED - FY77 / \$ 72000
TASK CODE=V625C-45 **EPA-D6-E721-DJ ** (IAG) PRIOR FY76 / \$ 209000

EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
INVESTIGATOR.: CD SAPP US TVA
HC JONES US TVA
MILESTONES....: 12/78 -MAJOR REPORT ON REMOTE MONITORING OF SO2 IMPACTS
PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
ORDIS CODES...: RECN-004137 SSIE-GMA 2938 1 EPA -D6-E721-DJ TASK-V625C-45
AP -625C DU -N140 LABT-EMI
ABSTRACT.....: THIS RESEARCH ACTIVITY INVOLVES TESTING, REFINEMENT, AND DEVELOPMENT OF REMOTE SENSING INSTRUMENTATION AND TECHNIQUES FOR MONITORING THE VISIBLE EFFECTS OF SO2 EMISSIONS FROM FOSSIL-FUELED ELECTRIC GENERATING STATIONS ON TERRESTRIAL VEGETATION. NASA IS COLLABORATING WITH TVA IN THE PROJECT. LOW- AND HIGH-ALTITUDE COLOR, COLOR INFRARED, MULTI-SPECTRAL SCANNING, AND OTHER TYPES OF IMAGERY AND GROUND-TRUTH DATA ARE BEING OBTAINED FOR EFFECTS ON SOYBEANS AND MIXED SOUTHERN PINE-DECIDUOUS HARDWOOD TIMBER STANDS IN THE VICINITIES OF THE SHAWNEE, WIDOWS CREEK, JOHNSONVILLE, AND COLBERT STEAM PLANTS FOR BOTH MANUAL AND AUTOMATED INTERPRETATIONS. MILESTONE REPORT DUE DECEMBER

****PROJECT: 04139-RADIOLOGICAL POLLUTANT QUALITY ASSURANCE**

STARTING/ COMPLETION DATE : 03/75 - 03/80 : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=V625C-64 **EPA-D7-E684-CN ** (IAG) PRIOR FY /

EPA OFFICER.: CW HALL EPA/HQOTRS- OEMI CTR FOR RADIATION RES
 INVESTIGATOR.: R HUTCHINSON US DOC/NBS
 MILESTONES...: 00/00 -DEVELOP THE FOLLOWING STANDARDS: RADIUM-226 IN SHALE PLUTONIUM-2 39
 12/77 -COMPLETE DEVELOPMENT OF MIXED GAMMA-RAY-EMITTING SOIL STANDARDS A ND
 06/78 -DEVELOP SOLUTION STANDARD OF 234U, 235U AND 238U IN NATURAL ISOTO PIC
 09/78 -DEVELOP 241PU SOLUTION STANDARD
 06/79 -DEVELOP 232TH SOLUTION STANDARD
 09/79 -DEVELOP SOLUTION STANDARD OF MIXED RADIONUCLIDES (3H, 90SR, 134CS
 09/80 -DEVELOP SOLUTION STANDARDS OF 210PB, 243CM, AND 244CM
 12/78 -DEVELOP FLY AS STANDARD CHARACTERIZED FOR 234U, 238U, 210PO, 218P O,
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: REC-N-004139 SSIE-GMA 4660 EPA -D7-E684-CN TASK-V625C-64
 AP -625C DU -N140 LABT-EMI
 ABSTRACT.....: THE OVERALL GOAL OR PURPOSE: TO PROVIDE METHODS AND STANDARDS FOR FOR ENVIRONMENTAL RADIOACTIVITY MEASUREMENTS IN ORDER TO IMPROVE THE ACCURACY OF THESE MEASUREMENTS FOR THE PURPOSE OF EQUITABLY TESTING COMPLIANCE WITH REGULATIONS AND ASSESSING PROGRESS TOWARD NATIONAL ENVIRONMENTAL GOALS. KEY OBJECTIVES: TO DEVELOP STANDARD REFERENCE MATERIALS FOR THE TESTING, CALIBRATION AND EVALUATION OF ENVIRONMENTAL RADIOACTIVITY MEASUREMENTS. TO PROVIDE REGULATORY AGENCIES (EPA, NRC AND APPROPRIATE STATE AGENCIES) WITH THE MEANS FOR RELATING ENVIRONMENTAL RADIOACTIVITY MEASUREMENTS TO THE NATIONAL MEASUREMENT SYSTEM. PRIOR YEAR ACCOMPLISHMENTS: DEVELOPED THE FOLLOWING STANDARDS: 5 LINE MIXED GAMMA-RAY STANDARD, POLONIUM-210.

****PROJECT: 04141-ENERGY RELATED WATER POLLUTANT STANDARD REFERENCE MATERIALS (SRMS)**

STARTING/ COMPLETION DATE : 03/75 - 03/80 : FUNDING : ESTIMATED - FY77 / \$ 150000
 TASK CODE=V625C-65 **EPA-D7-E684-CN ** (IAG) PRIOR FY76 / \$ 360000

EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: IL BARNES US DOC
 MILESTONES...: 12/78 -RESOLUTION OF ANALYTICAL PROBLEMS FOR FRESH WATER SRM
 03/77 -DEVELOPMENT OF PRECONCENTRATION TECHNIQUES FOR TRACE ELEMENTS IN
 07/77 -DEVELOPMENT OF STERILIZATION METHOD FOR SEA AND FRESH WATER
 06/78 -ISSUE PROCEEDINGS OF OFF-SHORE OIL OPERATIONS, COAL CONVERSION
 07/77 -ISSUE PROCEEDINGS OF OIL SHALE PROCESSING WORKSHOP
 09/77 -ISSUE PROCEEDINGS OF GEOTHERMAL, URANIUM MINING AND ANINE DRAINAG E
 08/77 -ISSUE FINAL SUMMARY REPORT
 08/77 -ISSUE SRM OF TRACE ELEMENTS IN WATER
 12/77 -DETERMINE FEASIBILITY PRECONCENTRATION, ION EXCHANGE FILTER
 03/78 -DETERMINE FEASIBILITY OF CERTIFYING ANION CONCENTRATIONS IN WATER
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: REC-N-004141 SSIE-GMA 4693 EPA -D7-E684-CN TASK-V625C-65
 AP -625C DU -N140 LABT-EMI
 ABSTRACT.....: THE OVERALL GOAL OR PURPOSE: TO IMPROVE THE RELIABILITY OF MEASUREMENTS OF TRACE ELEMENTS IN WATERS, BOTH FRESH AND SEA, FOR APPLICATION TO THE CERTIFICATION OF STANDARD REFERENCE MATERIALS. KEY OBJECTIVES: TO DEVELOP INSTRUMENTAL METHODS FOR THE ANALYSIS OF NG/G OR LOWER LEVELS OF TRACE ELEMENTS IN NATURAL WATERS, BOTH FRESH WATER AND SEA WATER; TO DEVELOP PRE-CONCENTRATION METHODS FOR ELEMENTS THAT CANNOT BE DETERMINED DIRECTLY AND TO APPLY THE METHODS TO DEVELOPMENT OF PROCEDURES FOR THE CERTIFICATION OF STANDARD REFERENCE MATERIALS; TO INVESTIGATE METHODS FOR THE STERILIZATION OF FRESH AND SEA WATERS; AND TO INVESTIGATE METHODS FOR FREEZE-DRYING AND RECONSTITUTION OF SEA WATER. PRIOR YEAR ACCOMPLISHMENTS: ANALYTICAL METHODS FOR 18 TRACE ELEMENTS IN FRESH WATER WERE DEVELOPED AND EVALUATED. AT LEAST TWO METHODS FOR EACH ELEMENT WERE FOUND TO BE OF SUITABLE ACCURACY. THIS TECHNOLOGY IS BEING TRANSFERRED TO THE CERTIFICATION OF A TRACE ELEMENTS IN WATE

****PROJECT: 04143-ENERGY RELATED, AIR POLLUTION MONITORING STANDARD REFERENCE MATERIALS,
INSTRUMENTATION AND METHODS**

STARTING/ COMPLETION DATE : 03/75 - 03/80 : FUNDING : ESTIMATED - FY77 / \$ 70000
 TASK CODE=V625C-66 **EPA-D7-E684 ** (IAG) PRIOR FY76 / \$ 158000
 EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: J TAYLOR US DOC
 MILESTONES....: 03/77 -COMPLETION OF EVALUATION OF ELECTROLYTIC GENERATION OF OZONE
 06/77 -COMPLETION OF EVALUATION OF UV GENERATION OF OZONE
 06/77 -COMPLETE INTERCOMPARISON OF OZONE REFERENCE METHODOLOGIES
 09/77 -COMPLETE DEVELOPMENT OF METHODS FOR CHEMICAL CHARACTERIZATION OF
 12/76 -COMPLETE EVALUATION STUDIES OF H2S PERMEATION TUBES
 12/76 -COMPLETE METHODS FOR NO2
 06/77 -COMPLETE STABILITY STUDY OF NO2, SO2
 09/77 -COMPLETE STABILITY STUDY OF NO
 09/77 -COMPLETE ACCURACY STUDY OF NO2, NO, SO2
 01/78 -NO2 IN AIR GAS BLEND SRM'S AT CONCENTRATIONS OF 250 PPM, 500PPM
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: RECN-004143 SSIE-GMA 4656 EPA -D7-E684 TASK-V625C-66
 AP -625C DU -N140 LABT-EMI

ABSTRACT.....: THE OVERALL GOAL OR PURPOSE: TO DEVELOP ACCURATE REFERENCE METHODS FOR MEASUREMENT OF AIR
 POLLUTANTS, AND FOR CERTIFICATION OF REFERENCE MATERIALS, TO PROVIDE MEANS FOR ADEQUATELY TESTING
 COMPLIANCE WITH AIR POLLUTION REGULATIONS AND FOR ASSESSING PROGRESS TOWARD AIR POLLUTION ABATEMENT
 GOALS. TO PROVIDE STANDARD REFERENCE MATERIALS FOR USE IN THE CONTROL OF COMBUSTION EQUIPMENT AND
 COMBUSTION PROCESSES AND IN INDUSTRIAL PROCESSES RELATED TO ENERGY PRODUCTION. KEY OBJECTIVES:
 STATE-OF-THE-ART ANALYTICAL METHODS WILL BE DEVELOPED, TO ENABLE CERTIFICATION OF REFERENCE
 MATERIALS FOR CRITICAL AIR POLLUTION MEASUREMENTS. SOURCES OF ERROR IN PRESENT METHODS WILL BE
 MINIMIZED AND IMPROVED METHODS WILL BE DEVELOPED AS APPROPRIATE. NEW APPROACHES TO PRODUCE
 REFERENCE MATERIALS WILL ALSO BE INVESTIGATED. TO DETERMINE THE FEASIBILITY OF PREPARING GASEOUS
 MIXTURES OF OXYGEN, CARBON DIOXIDE, SULFUR DIOXIDE, NITROGEN OXIDES AND HYDROGEN SULFIDE FOR USE AS
 STANDARD REFERENCE MATERIALS. TO EXPLORE ALTERNATE METHODS OF PREPARING GAS MIXTURES FOR
 CALIBRATION FOR SPECIES TOO REACTIVE TO BE PREPARED AS GAS MIXTURES. PRIOR YEAR ACCOMPLISHMENTS:
 PRELIMINARY EVALUATION OF ELECTROLYTIC METHOD FOR GENERATOR OF OZONE. EVALUATION OF METHODS FOR
 MEASURING OZONE. EVALUATION OF OZONE SOURCE UTILIZING UV FOR SEVERAL AMBIENT PARAMETERS. CALIBRATED
 OZONE GENERATORS USED BY STATE AND FEDERAL AGENCIES IN WIDE-AREA MEASUREMENT OF OZONE IN ORDER TO
 ASSURE INTERCOMPARABILITY OF MEASUREMENT. DEVELOPED METHODS FOR HOMOGENIZATION OF A LARGE QUANTITY
 OF URBAN PARTICULATE MATTER FOR USE AS A REFERENCE MATERIAL. COMPLETED SRM SO2 FOR STATIONARY
 SOURCE MONITORS. COMPLETED SRM OF CO IN AIR FOR SOURCE AND AMBIENT MONITORING. EVALUATED H2S
 PERMEATION TUBES IN INERT ATMOSPHERE. COMPLETED STUDY OF ONE ACCURATE METHOD FOR MEASUREMENT OF
 HIGH CONCENTRATIONS OF NO2.

****PROJECT: 04145-ENERGY RELATED AIR POLLUTION MONITORING STANDARD REFERENCE MATERIALS,
INSTRUMENTATION AND METHODS**

STARTING/ COMPLETION DATE : 03/75 - 03/80 : FUNDING : ESTIMATED - FY77 / \$ 110000
 TASK CODE=V625C-67 **EPA-D7-E684 ** (IAG) PRIOR FY /
 EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: K HEINRICH US DOC
 MILESTONES....: 03/77 -COMPLETION OF THIN FILMS OF GLASSES BY SECONDARY ION SPUTTERING
 08/77 -COMPLETION OF COMPOSITION CHARACTERIZATION OF FILMS
 08/77 -COMPLETION OF OPTICAL AND SCANNING ELECTRON MICROSCOPY STUDY OF
 00/00 -DESIGN OF CENTRIFUGAL PARTICLE DOPPLER SHIFT SPECTROSCOPY (PDSS)
 09/77 -COMPARISON TESTS OF SIZE DISTRIBUTION AND TEMPORAL STABILITY FOR
 05/77 -COMPLETE MICROPROBE ANALYSIS OF THIN FILMS
 07/77 -DEMONSTRATE UNIFORMITY OF SPUTTERED SAMPLES
 06/78 -RESEARCH MATERIALS AVAILABLE
 10/77 -DEVELOP METHOD FOR ADHERING PARTICLES TO FILTER MATERIAL AND
 06/78 -RESEARCH MATERIALS AVAILABLE
 PLAN ID.....: (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.
 ORDIS CODES...: RECN-004145 SSIE-GMA 4661 EPA -D7-E684 TASK-V625C-67
 AP -625C DU -N140 LABT-EMI

ABSTRACT.....: OVERALL GOAL OR PURPOSE: TO PROVIDE CALIBRATION STANDARDS AND BASIC MEASUREMENT METHODS FOR
 PARTICULATE MATTER IN THE ATMOSPHERE, TO OBTAIN THE ACCURACY REQUIRED TO EQUITABLY TEST COMPLIANCE
 WITH AIR POLLUTION REGULATIONS, AND TO ASSESS PROGRESS TOWARD NATIONAL AIR POLLUTION ABATEMENT
 GOALS. KEY OBJECTIVES: TO DEVELOP CALIBRATION STANDARDS OF PARTICULATE MATTER OF STABLE AND
 ACCURATELY CHARACTERIZED COMPOSITION (E.G., THIN FILM STANDARDS FOR X-RAY FLUORESCENCE ANALYSIS);
 TO DEVELOP MEASUREMENT TECHNIQUES FOR THE ACCURATE PHYSICAL AND CHEMICAL CHARACTERIZATION OF
 ATMOSPHERIC PARTICULATES TO STUDY ASBESTOS CHARACTERIZATION. PRIOR YEAR ACCOMPLISHMENTS: INITIAL
 PDSS SYSTEM WITH WIND TUNNEL CONSTRUCTED. REVISED PDSS SYSTEM WITH STATIC AIR PARTICLE CHAMBER
 CONSTRUCTED. MEASURED COMPOSITIONAL ACCURACY OF SELECTED COMMERCIAL THIN FILM STANDARDS.
 INVESTIGATED POTENTIAL OF SECONDARY ION DEPOSITION FOR PREPARATION OF THIN FILMS OF KNOWN
 COMPOSITION.

****PROJECT: 04148-LIDAR TECHNIQUES FOR MEASURING PARTICULATE POLLUTANTS FROM ENERGY PRODUCTION AND THEIR TRANSPORT AND DISPERSION PROCESSES**

STARTING/ COMPLETION DATE : 07/75 - 07/80 : FUNDING : ESTIMATED - FY77 / \$ 190000
TASK CODE=V625C-70 **EPA-D5-E693-EB ** (IAG) PRIOR FY76 / \$ 389000

EPA OFFICER.: GJ D'ALESSIO EPA/HDQTRS- OEMI
INVESTIGATOR.: VE DERR US DDC/NOAA ENV RES LABS/WAVE PROP LAB
RL SCHWIESOW US DDC/NOAA ENV RES LABS/WAVE PROP LAB
GT MCNICE US DDC/NOAA ENV RES LABS/WAVE PROP LAB

PLAN ID..... (AP-625C)(DU-N140) ENERGY-RELATED POLLUTANT & EFFECTS MONITORING, METHODS & TECH.

ORDIS CODES.: RECN-004146 SSIE-GMA 3036 1 EPA -D5-E693-EB TASK-V625C-70
AP -625C DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: 1. DEVELOP LIDAR TECHNIQUES FOR TRACING AND ANALYZING POLLUTANTS. 2. DEVELOP DOPPLER LIDAR TECHNIQUES FOR MEASUREMENT OF POLLUTANT TRANSPORT PROCESSES. APPROACH: 1. USE INDEPENDENT MULTI-WAVELENGTH LIDAR TRANSMISSIONS AND DEPOLARIZATION INFORMATION TO IDENTIFY AND DISTINGUISH NATURAL AEROSOLS AND THOSE RESULTING FROM MAN'S ACTIVITIES. STUDY USES OF DIFFERENTIAL ABSORPTION AND INELASTIC SCATTER FOR AEROSOL IDENTIFICATION. UTILIZE LIDAR IN FEASIBILITY STUDIES OF SMOKESTACK PLUME TRACINGS. 2. DEVELOP CO2 DOPPLER LIDAR TECHNIQUES FOR MEASURING WIND VELOCITY IN THE "CLEAR" AIR. MEASURE STACK VELOCITIES AND WIND AND TURBULENCE PROFILES. CURRENT PROGRESS: 1. LIDAR TECHNIQUES. THE POLARIZATION SENSITIVE LIDAR HAS DEMONSTRATED AN ABILITY TO DISTINGUISH COAL-FIRED STACK EMISSIONS FROM NEWLY RISEN STRIP MINE DUST AND TO FOLLOW THE PLUME AS IT MOVES UNDER THE INFLUENCE OF WINDS AND TERRAIN. THE TWO-WAVELENGTH LIDAR (.694 AND .347 MICRON) HAS BEEN USED TO DISTINGUISH BETWEEN STACK EMISSION, AMBIENT DRY AEROSOLS, AND COOLING POND CLOUDS. 2. DOPPLER LIDAR. WIND AND TURBULENCE PROFILES HAVE BEEN MEASURED UNDER A VARIETY OF TERRAIN AND ATMOSPHERIC CONDITIONS BY USING AN OPERATIONAL, FIELD-TESTED DOPPLER LIDAR. WE CONTINUE TO IMPROVE THE SCANNING AND DATA PROCESSING CAPABILITIES OF THE SYSTEM TO BETTER MEET POLLUTANT TRANSPORT MEASUREMENT NEEDS. A MAJOR MILESTONE IS 06/78, TO USE AN OFFSET LOCAL OSCILLATOR TO EXTRACT A SMALL MEAN VELOCITY COMPONENT FROM A LARGE-TURBULENCE STACK EFFLUENT SITUATION.

****PROJECT: 03185-IDENTIFY AND MEASURE CHEMICAL ELEMENTS AND VOLATILE ORGANICS IN ENERGY-RELATED WASTES**

STARTING/ COMPLETION DATE : 09/76 - 04/78 : FUNDING : ESTIMATED - FY77 / \$ 100000
TASK CODE=K625D-141 **EPA-68-03-2487 ** (CNTR.) PRIOR FY76 / \$ 122000

EPA OFFICER.: AL ALFORD EPA/ERL - ATHENS
INVESTIGATOR.: JF RYAN GULF SOUTH RESEARCH INST

MILESTONES...: 06/77 -FIRST CONTRACTOR'S REPORT ON POLLUTANTS IN ENERGY-RELATED WASTES

04/78 -SECOND CONTRACTOR'S REPORT ON POLLUTANTS IN ENERGY-RELATED WASTES

PLAN ID..... (AP-625D)(DU-N140) ENERGY-RELATED POLLUTANT MEASUREMENT AND INSTRUMENT DEVEL.

ORDIS CODES.: RECN-003185 SSIE-GMA 3503 EPA -68-03-2487 TASK-K625D-141
AP -625D DU -N140 LABT-ALW

ABSTRACT..... A CONTRACTOR WILL IDENTIFY AND MEASURE POLLUTANTS IN ENERGY-RELATED SOLID WASTES AND LIQUID EFFLUENTS. INFORMATION ABOUT DATA OBTAINED IN OTHER CURRENT INVESTIGATIONS OF ENERGY-RELATED POLLUTION WILL BE SUMMARIZED TO IDENTIFY INFORMATION GAPS AND TO SELECT SAMPLES THAT WILL PROVIDE MAXIMUM INFORMATION. TO PERMIT EFFICIENT USE OF SMALL DEDICATED COMPUTERS, A SYSTEM DESIGNED TO RAPIDLY SEARCH A DATA BANK OF 10,000 MASS SPECTRA WILL BE INSTALLED TO EVALUATE ITS POTENTIAL USE IN INDIVIDUAL EPA LABORATORIES.

****PROJECT: 04150-ENERGY-RELATED AIR POLLUTANT ANALYSIS INSTRUMENTATION**

STARTING/ COMPLETION DATE : 03/75 - 03/80 : FUNDING : ESTIMATED - FY77 / \$ 75000
TASK CODE=V625D-59 **EPA-D7-E684 ** (IAG) PRIOR FY76 / \$ 169000

EPA OFFICER.: GJ D'ALESSIO EPA/HDQTRS- OEMI

INVESTIGATOR.: R MCKENZIE US DDC

MILESTONES...: 12/76 -FIELD TEST SULFATE AEROSOL MONITOR
03/77 -FIELD TEST SULFATE AEROSOL MONITOR - STATIONARY SOURCES

06/77 -TEST MONITOR WITH VARYING SULFATE SALTS

06/77 -REPORT ON INSTRUMENTS FOR MEASURING PARTICULATE SULFUR

06/78 -REPORT ON SPECIATION OF PARTICULATE SULFUR COMPOUNDS

PLAN ID..... (AP-625D)(DU-N140) ENERGY-RELATED POLLUTANT MEASUREMENT AND INSTRUMENT DEVEL.

ORDIS CODES.: RECN-004150 SSIE-GMA 4657 EPA -D7-E684 TASK-V625D-59
AP -625D DU -N140 LABT-EMI

ABSTRACT..... THE OVERALL GOAL OR PURPOSE: TO PROVIDE THE MEANS FOR IDENTIFYING AND QUANTIFYING SULFUR COMPOUNDS IN ATMOSPHERIC PARTICULATE MATTER IN ORDER TO PROVIDE A MEASUREMENT BASIS FOR STUDIES ON HEALTH EFFECTS WHICH WILL BE MANDATED IN PENDING LEGISLATION. KEY OBJECTIVES: TO DEVELOP AND CHARACTERIZE A CONTINUOUS PARTICULATE SULFUR ANALYZER SUITABLE FOR FIELD USE. TO DEVELOP AN INSTRUMENT CAPABLE OF IDENTIFYING INDIVIDUAL SULFUR COMPOUNDS IN ATMOSPHERIC AEROSOLS. PRIOR YEAR ACCOMPLISHMENTS: A SULFATE AEROSOL MONITOR CONSISTING OF A COUPLED FLAME PHOTOMETRIC DETECTOR AND PULSED ELECTROSTATIC PRECIPITATOR WAS CONSTRUCTED AND PRELIMINARY STUDIES INDICATE PROMISING MEASUREMENT CAPABILITIES. PRELIMINARY EXPERIMENTS ALSO SHOWED THE CAPABILITIES FOR CHEMICAL CHARACTERIZATION OF AEROSOLS BY MONITORING THE RATE OF GROWTH OF PARTICLES IN A CONTROLLED HUMIDITY.

****PROJECT: 04152-ENERGY RELATED WATER POLLUTANT ANALYSES INSTRUMENTATION**

STARTING/ COMPLETION DATE : 03/75 - 03/80 : FUNDING : ESTIMATED - FY77 / \$ 110000
 TASK CODE=V625D-60 **EPA-D7-E684 ** (IAG) PRIOR FY76 / \$ 245000

EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: H HERTZ US DOC

MILESTONES...: 02/77 -EXAMINE STABILITY OF AN AQUEOUS SOLUTION OF POLYNUCLEAR AROMATIC
 05/77 -USE OF AN AQUEOUS SOLUTION OF C14-LABELED HYDROCARBONS TO STUDY
 09/77 -INVESTIGATE LONGER RANGE STABILITY OF AN AQUEOUS TRACE LEVEL
 06/77 -SEARCH FOR POSSIBLE ORGANIC "MARKER" COMPOUNDS IN WATER ASSOCIATE D
 06/77 -DEVELOP CONCENTRATION TECHNIQUES FOR POLAR ORGANICS COMPOUNDS
 06/80 -DEVELOP LIQUID CHROMATOGRAPHY MASS SPECTROMETRY INSTRUMENTATION
 01/80 -DEVELOPMENT OF MARKER COMPOUNDS TO BE USED AS INTERNAL STANDARDS
 00/00 -DEVELOPMENT OF METHODS FOR COUPLING LIQUID-CHROMATOGRAPHY WITH MA SS
 01/78 -REPORT ON FEASIBILITY OF ALTERNATIVE APPROACHES
 01/78 -DEVELOPMENT AND TESTING OF PRELIMINARY INTERFACE

PLAN ID.....: (AP-625D)(DU-N140) ENERL -RELATED POLLUTANT MEASUREMENT AND INSTRUMENT DEVEL.
 ORDIS CODES...: RECN-004152 SSIE-GMA 4658 EPA -D7-E684 TASK-V625D-60
 AP -625D DU -N140 LABT-EMI

ABSTRACT.....: KEY OBJECTIVE: TO RELEASE A SERIES OF SRM'S FOR TRACE PETROLEUM IN WATER ANALYSES. PRIOR YEAR
 ACCOMPLISHMENTS: THE SOLUBILITY OF PETROLEUM IN WATER WAS STUDIED IN ORDER TO EVALUATE THE
 FEASIBILITY OF A CRUDE OIL IN WATER SRM. A PRELIMINARY STABILITY STUDY OF PETROLEUM MARKER
 COMPOUNDS IN WATER WAS CARRIED OUT. A SERIES OF INTERNAL STANDARD COMPOUNDS HAVE BEEN STUDIED FOR
 USE IN QUANTITATING PETROLEUM HYDROCARBONS IN ENVIRONMENTAL SAMPLES. SEVERAL MARKER COMPOUNDS FOR
 IDENTIFICATION OF PETROLEUM POLLUTION HAVE BEEN IDENTIFIED. MASS SPECTROMETRIC INSTRUMENTATION FOR
 USE IN THE LC-MS EXPERIMENT HAS BEEN DESIGNED AND ORDERED. RESIN TECHNIQUES FOR EXTRACTING PHENOLS
 FROM ENVIRONMENTAL SAMPLES HAVE BEEN STUDIED.

****PROJECT: 04153-ENERGY RELATED WATER POLLUTANT ANALYSES INSTRUMENTATION**

STARTING/ COMPLETION DATE : 03/75 - 03/80 : FUNDING : ESTIMATED - FY77 / \$ 45000
 TASK CODE=V625D-61 **EPA-D7-E684 ** (IAG) PRIOR FY /

EPA OFFICER.: G D'ALESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: R DURST US DOC

MILESTONES...: 10/77 -DEVELOP METHOD FOR CYANIDE DETECTION
 06/80 -DEVELOP WATER SAMPLE SPECIATION TECHNIQUES
 06/78 -ANALYZE COUPLING LIQUID CHROMATOGRAPHY FOR ORGANOMETALS

PLAN ID.....: (AP-625D)(DU-N140) ENERGY-RELATED POLLUTANT MEASUREMENT AND INSTRUMENT DEVEL.
 ORDIS CODES...: RECN-004153 SSIE-GMA 4648 EPA -D7-E684 TASK-V625D-61
 AP -625D DU -N140 LABT-EMI

ABSTRACT.....: THE OVERALL GOAL OR PURPOSE: TO IMPROVE THE ACCURACY OF WATER POLLUTION ANALYSIS THROUGH THE
 DEVELOPMENT OF REFERENCE MATERIALS AND ANALYTICAL REFERENCE METHODOLOGY. KEY OBJECTIVES: TO
 INVESTIGATE SOURCES OF ERROR IN WATER POLLUTION METHODOLOGY, TO EVALUATE METHODS FOR RELIABLE WATER
 POLLUTION MONITORING, TO IMPROVE EXISTING METHODS OR DEVELOP NEW METHODS AS NEEDED TO PROVIDE
 RELIABLE POLLUTION MEASUREMENTS, TO MEASURE FUNDAMENTAL EQUILIBRIUM CONSTANTS NEEDED TO INTERPRET
 WATER POLLUTION DATA, TO DEVELOP REFERENCE MATERIALS NEEDED TO ELIMINATE ANALYTICAL BIAS. PRIOR
 YEAR ACCOMPLISHMENTS: COMPLETED DEVELOPMENT PHASE FOR A HEAVY-METAL-IN-WATER SRM.

****PROJECT: 04155-ENERGY RELATED WATER POLLUTANT ANALYSES INSTRUMENTATION**

STARTING/ COMPLETION DATE : 03/75 - 03/80 : FUNDING : ESTIMATED - FY77 / \$ 45000
 TASK CODE=V625D-62 **EPA-D7-E684 ** (IAG) PRIOR FY /

EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: J DEVOE US DOC

MILESTONES...: 05/77 -OPTIMIZATION OF EXPERIMENTAL METHOD
 09/77 -LIMITING NOISE SOURCE AND PRINCIPAL INTERFERENCE EFFECTS FOR ABOV E
 06/77 -RANGE AND LIMIT FOR FIVE ELEMENTS--LASER-INDUCED OPTICAL
 06/78 -TEMPERATURE-PROGRAMMED PLASMA FLAME EMISSION DETECTOR ANALYSIS

PLAN ID.....: (AP-625D)(DU-N140) ENERGY-RELATED POLLUTANT MEASUREMENT AND INSTRUMENT DEVEL.
 ORDIS CODES...: RECN-004155 SSIE-GMA 4655 EPA -D7-E684 TASK-V625D-62
 AP -625D DU -N140 LABT-EMI

ABSTRACT.....: THE OVERALL GOAL OR PURPOSE: TO CHARACTERIZE A NEW TECHNIQUE FOR DETECTING LASER-INDUCED OPTICAL
 ABSORPTIONS, AND EVALUATE THE POTENTIAL CONTRIBUTION OF THE METHOD TO ANALYTICAL SPECTROSCOPY. KEY
 OBJECTIVES: IDENTIFY THE PRINCIPAL FACTORS CONTRIBUTING TO SENSITIVITY, NOISE, MATRIX INTERFERENCE;
 APPLY THE METHOD TO ALL ELEMENTS AMENABLE TO THE AVAILABLE LASER WAVELENGTH RANGE AND THE
 ANALYTICAL FLAME; CATALOG MATRIX INTERFERENCES; DEVELOP SAMPLE TREATMENTS AND/OR MEASUREMENT
 PROTOCOLS TO CIRCUMVENT OR MINIMIZE INTERFERENCES.

****PROJECT: 04156-ENERGY-RELATED WATER POLLUTANT ANALYSES INSTRUMENTATION**

STARTING/ COMPLETION DATE : 03/75 - 03/80 : FUNDING : ESTIMATED - FY77 / \$ 0
 TASK CODE=V625D-63 **EPA=D7-E684 ** (IAG) PRIOR FY /

EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: D NEWBURY US DOC
 MILESTONES...: 03/77 -COMPLETION OF STUDY OF TECHNIQUES FOR ION MICROPROBE DEPTH PROFIL ING
 06/77 -COMPLETION OF STUDY OF GLASS RESEARCH MATERIALS AS POSSIBLE PARTI CULATE
 09/77 -COMPLETION OF STUDY OF LAYERED PARTICLES FROM THE ENVIRONMENT
 06/77 -DEVELOP ION MICROPROBE TECHNIQUE FOR EXAMINING ELEMENTAL PROFILES

PLAN ID.....: (AP-625D)(DU-N140) ENERGY-RELATED POLLUTANT MEASUREMENT AND INSTRUMENT DEVEL.
 ORDIS CODES...: RECN-004156 SSIE-GMA 4659 EPA -D7-E684 TASK-V625D-63
 AP -625D DU -N140 LABT-EMI

ABSTRACT.....: THE OVERALL GOAL OF PURPOSE: THE GOAL OF THE STUDY IS TO DEVELOP ION MICROPROBE TECHNIQUES TO CHARACTERIZE THE DISTRIBUTION IN DEPTH OF ELEMENTS IN PARTICULATES IN SURFACE LAYERS UP TO 1 MICROGRAM DEEP. KEY OBJECTIVES: TO PROVIDE IMPROVED ION MICROPROBE ANALYSIS TECHNIQUES FOR PARTICULATES. TO CHARACTERIZE LAYERED PARTICLES COLLECTED FROM VARIOUS SOURCES IN THE ENVIRONMENT. TO TEST GLASS RESEARCH MATERIALS (RM) FOR SUITABILITY AS POSSIBLE PARTICULATE STANDARDS. PRIOR YEAR ACCOMPLISHMENTS: DEVELOPMENT OF SATISFACTORY MOUNTING TECHNIQUES FOR STABLE, LONG-TERM ANALYSES OF INDIVIDUAL MICROMETER-SIZED PARTICLES UNDER ION BOMBARDMENT. DIRECT OBSERVATION OF INDIVIDUAL MICROMETER-SIZED PARTICLES BY HIGH-BRIGHTNESS POSITIVE ION BEAMS.

****PROJECT: 04157-ENERGY-RELATED REMOTE AND IN SITU SENSING INSTRUMENT DEVELOPMENT**

STARTING/ COMPLETION DATE : 07/75 - 06/79 : FUNDING : ESTIMATED - FY77 / \$ 155000
 TASK CODE=V625D-68 **EPA=D6-E771-BEU ** (IAG) PRIOR FY76 / \$ 183000

EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: EV BROWELL US NASA
 F ALLARIO US NASA
 GL GREGORY US NASA

PLAN ID.....: (AP-625D)(DU-N140) ENERGY-RELATED POLLUTANT MEASUREMENT AND INSTRUMENT DEVEL.
 ORDIS CODES...: RECN-004157 SSIE-GMA 4649 EPA -D6-E771-BEU TASK-V625D-68
 AP -625D DU -N140 LABT-EMI

ABSTRACT.....: OBJECTIVES: TO DEVELOP ADVANCED AND IMPROVED INSTRUMENT TECHNIQUES FOR MEASURING ENVIRONMENTAL PARAMETERS ASSOCIATED WITH THE GENERATION OF ELECTRICAL ENERGY AND OTHER POLLUTION SOURCES. APPROACH: TO MEET THESE OBJECTIVES, THE FOLLOWING TASKS WILL BE CONDUCTED: TASK 1 - RAMAN LIDAR - EVALUATE RAMAN LIDAR FOR REMOTE MEASUREMENT OF SO2 CONCENTRATION AT POWER-PLANT STACK EXIT. TASK 2 - PLUME DISPERSION STUDIES: APPLY AEROSOL SCATTERING LIDAR TECHNIQUES TO THE STUDY OF PLUME DISPERSION UNDER VARIOUS ATMOSPHERIC CONDITIONS. TASK 3 - IR DIAL - TO DEVELOP AND APPLY THE TUNABLE INFRARED (IR) DIFFERENTIAL ABSORPTION LIDAR (DIAL) TECHNIQUE TO THE REMOTE MEASUREMENT OF MOLECULAR PLUME EFFLUENTS. TASK 4 - LASER HETERODYNE DETECTOR - TO EVALUATE THE USE OF THE LASER HETERODYNE DETECTOR TECHNIQUE AS A MEANS TO INCREASE THE SENSITIVITY OF LONG PATH CONTINUOUS WAVE ABSORPTION MEASUREMENTS USING DIFFUSE REFLECTORS. TASK 5 - HCL MONITOR - TO DEVELOP AND DELIVER TO EPA AN IMPROVED IN SITU HCL CHEMILUMINESCENT MONITOR. TASK 6 - UV DIAL - TO EVALUATE THE UV DIFFERENTIAL ABSORPTION LIDAR (DIAL) TECHNIQUE FOR REMOTE MEASUREMENTS OF THE CONCENTRATION OF SO2, O3, AND AEROSOLS AT A POWER-PLANT STACK EXIT AND WITHIN THE STACK PLUME. CURRENT PLANS AND/OR PROGRESS: NECESSARY MODIFICATIONS TO THE RAMAN LIDAR HAVE BEEN COMPLETED. A CONTRACT HAS BEEN LET FOR THE TUNABLE IR LASER (DELIVERY JANUARY, 1978) WHICH WILL BE INTEGRATED WITH THE IR TELESCOPE, DETECTOR, AND DATA PROCESSOR TO CONSTRUCT A MOBILE LIDAR SYSTEM. THE LASER HETERODYNE DETECTOR IN THE LONG PATH LASER MONITORING SYSTEM IS UNDER EVALUATION, WITH A TECHNICAL REPORT ON THE EFFECTS OF SPECKLE SCHEDULED FOR COMPLETION IN JANUARY, 1978. ALL LABORATORY AND FIELD EVALUATION OF THE HCL DETECTOR HAVE BEEN COMPLETED. THE UV DIAL SYSTEM WILL BE CALIBRATED AND FIELD TESTED JOINTLY WITH EPA DURING JANUARY 1978. OPERATIONAL FIELD TESTS ARE SCHEDULED FOR APRIL, 1978.

****PROJECT: 04159-OPTICAL ABSORPTION PROPERTIES OF SULFATE AEROSOL**

STARTING/ COMPLETION DATE : 00/75 - 00/78 : FUNDING : ESTIMATED - FY77 / \$ 30000
 TASK CODE=V625D-69 **EPA=D7-E681-CG ** (IAG) PRIOR FY /

EPA OFFICER.: GJ D'ALESSIO EPA/HQOTRS- OEMI
 INVESTIGATOR.: PT CUNNINGHAM US DOE ARGONNE NATL LAB
 R KUMAR US DOE ARGONNE NATL LAB
 SA JOHNSON US DOE ARGONNE NATL LAB

MILESTONES...: 04/78 -COMPLETE FIELD TESTING
 04/78 -INITIATE FIELD INSTRUMENT DESIGN
 09/78 -COMPLETE INSTRUMENT DESIGN

PLAN ID.....: (AP-625D)(DU-N140) ENERGY-RELATED POLLUTANT MEASUREMENT AND INSTRUMENT DEVEL.
 ORDIS CODES...: RECN-004159 SSIE-GMA 5363 EPA -D7-E681-CG TASK-V625D-69
 AP -625D DU -N140 LABT-EMI

ABSTRACT.....: THE OBJECTIVE OF THIS PROGRAM IS TO DEVELOP TECHNIQUES AND PROCEDURES FOR THE MEASUREMENT OF SULFATE AND ACID SULFATE IN ATMOSPHERIC AEROSOL MATERIAL. THE APPROACH IS BASED ON THE DETERMINATION OF THE INFRARED ABSORPTION SPECTRA OR OTHER CHARACTERISTIC SPECTRA OF THE AEROSOL MATERIAL AND ITS DERIVATIVES. PROGRESS DURING THE PAST YEAR HAS INCLUDED DEVELOPMENT OF PROCEDURES THAT PRESERVE THE ACIDITY OF SAMPLES COLLECTED ON FILTERS DURING THE SAMPLES PREPARATION STEPS PRIOR TO OBTAINING THE SPECTRUM. THE INFRARED CHARACTERIZATION TECHNIQUE HAS BEEN COMPARED IN THE FIELD WITH OTHER METHODS FOR THE MEASUREMENT OF SULFATE AND ACIDIC SULFATE AEROSOL. CURRENT PLANS ARE TO CONTINUE TO DEVELOP NEW TECHNIQUES AND IMPROVED PROCEDURES FOR SULFATE AEROSOL CHARACTERIZATION.

Health Effects

****PROJECT: 01277-COMPARATIVE TOXICOLOGICAL EVALUATION OF EMISSIONS FROM POWER PLANTS
USING EASTERN VS WESTERN COALS**

STARTING/ COMPLETION DATE : 07/77 - 06/78 : FUNDING : ESTIMATED - FY77 / \$ 160000
TASK CODE=D625F-011 **EPA-68-03-2601 ** (CNTR.) PRIOR FY /

EPA OFFICER.: R DANNER EPA/HERL - CINC
INVESTIGATOR.: VN FINELLI UNIVERSITY OF CINCINNATI
HG PETERING UNIVERSITY OF CINCINNATI
TE CODY UNIVERSITY OF CINCINNATI
VJ ELIA UNIVERSITY OF CINCINNATI
E MENDEN UNIVERSITY OF CINCINNATI
R CHRISTIAN UNIVERSITY OF CINCINNATI

MILESTONES...: 10/77 -COLLECTION OF SAMPLES
02/78 -IN-VITRO STUDY
02/78 -IN-VIVO STUDY
06/78 -COMPLETION

PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
ORDIS CODES...: RECN-001277 SSIE-GMA 4501 EPA -68-03-2601 TASK-D625F-011
AP -625F DU -N140 LABT-HEE

ABSTRACT.....: THIS IS ONE OF A MULTI-PART PROJECT WHOSE SUMMARY MAY BE IDENTICAL TO OTHERS. THIS PROPOSED WORK PROVIDES FOR AN EXPANDED BIOLOGICAL TESTING REGIMEN TO INCLUDE WHOLE-ANIMAL IN VIVO TESTING AND A COMPREHENSIVE IN VITRO TOXICITY TESTING REGIMEN COUPLED WITH THE PHYSICOCHEMICAL CHARACTERIZATION OF THE COALS AND COAL EMISSIONS CONDENSATE DATA TO ASSESS THE TOXICOLOGICAL EFFECTS OF STACK EMISSIONS (CONDENSATES) FROM EASTERN VS. WESTERN COAL. THE IN VIVO TESTING REGIMEN CONSISTING OF INTRATRACHEAL INTUBATION OF FRACTIONATED AND UNFRACTIONATED OF THE STACK EMISSIONS CONDENSATE INTO RATS. AT SPECIFIC TIME INTERVALS THE RATS WILL BE INTRAVENOUSLY INJECTED WITH RADIO IODINATED ALBUMIN AND AFTER SIX HOURS THE ANIMALS WILL BE ANESTHETIZED AND THE LUNGS LAVAGED WITH SALINE. BLOOD AND TISSUES WILL BE COLLECTED AND SAVED FOR FUTURE ANALYSES. PULMONARY ALVEOLAR MACROPHAGES (PAM) IN THE LAVAGE FLUID WILL BE COUNTED AND OBSERVED UNDER MICROSCOPY FOR MORPHOLOGICAL ASSESSMENT. ALIQUOTS OF THE LAVAGE SOLUTION WILL BE ADDED TO SCINTILLATION COCKTAIL AND COUNTED FOR 131I RADIOACTIVITY. THE REMAINING LAVAGE FLUID WILL BE CENTRIFUGED AND THE SUPERNATANT ASSAYED FOR LYSOZYME ACTIVITY AND TOTAL PROTEIN CONTENT. BLOOD, LUNG AND OTHER TISSUES WILL BE ANALYZED FOR METALS BY ATOMIC ABSORPTION SPECTROSCOPY. THE METALS TO BE ANALYZED ARE SELECTED FROM THOSE WHICH HAVE BEEN FOUND TO BE PRESENT IN THE STACK EMISSION CONDENSATES. ON ALL EXPERIMENTAL AND CONTROL ANIMALS A COMPLETE AUTOPSY WILL BE DONE. ANY GROSS ABNORMALITIES WILL BE RECORDED IN BRIEF DESCRIPTIONS. FROM ALL ORGANS REPRESENTATIVE SEGMENTS WILL BE TAKEN FOR MICROSCOPIC EXAMINATION. THESE WILL BE STAINED WITH HEMATOXYLIN AND EOSIN. INCLUDED IN THIS PROPOSAL ARE PROGRAMS FOR MUTAGENICITY TESTING BY THE MAMMALIAN CELL MUTAGENESIS ASSAY AND THE SALMONELLA TYPHIMURIUM ASSAY ("AMES TEST"). THESE PROCEDURES WILL COMPLEMENT ONE ANOTHER IN EVALUATION OF MUTAGENIC POTENTIAL OF THE SAMPLES WHILE PERMITTING A COMPARISON OF THE RESPONSE OF THE TWO METHODS TO SAMPLES OF POWER PLANT EXHAUST CONDENSATES. THE EFFECTS OF THE FRACTIONATED SAMPLES ON THE ACTIVITY OF COMMERCIALY AVAILABLE METALLOENZYMES, SUCH AS TYROSINASE, GALACTOSE OXIDASE, CATALASE, ALA-D, ETC., WILL BE TESTED.

****PROJECT: 01279-INVESTIGATION OF EFFECTS OF PROLONGED INHALATION OF NICKEL-ENRICHED FLY
ASH IN SYRIAN GOLDEN HAMSTERS**

STARTING/ COMPLETION DATE : 09/76 - 09/79 : FUNDING : ESTIMATED - FY77 / \$ 325000
TASK CODE=D625F-112 **EPA-68-03-2457 ** (CNTR.) PRIOR FY /

EPA OFFICER.: W MOORE EPA/HERL - CINC
INVESTIGATOR.: AP WEHNER BATTELLE MEMORIAL INST
OR MOSS BATTELLE MEMORIAL INST
GE DAGLE BATTELLE MEMORIAL INST
R BUSCHBOM BATTELLE MEMORIAL INST
RE BARRETT BATTELLE MEMORIAL INST

MILESTONES...: 11/76 -INITIATE CONTRACT WORK
09/77 -GENERATE FLY ASH
12/77 -INITIATE ANIMAL EXPOSURE
09/78 -INITIATE PHASE II OF STUDY

PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
ORDIS CODES...: RECN-001279 SSIE-GMA 3367 1 EPA -68-03-2457 TASK-D625F-112
AP -625F DU -N140 LABT-HEE

ABSTRACT.....: OBJECTIVES: TO INVESTIGATE (A) DEVELOPMENT OF LESIONS INDUCED BY INHALATION OF NI-ENRICHED FLY ASH (NEFA) AS A FUNCTION OF EXPOSURE TIME AND AEROSOL CONCENTRATION, (B) MORTALITY AS A FUNCTION OF EXPOSURE, (C) REVERSIBILITY OF NEFA-INDUCED LESIONS AS A FUNCTION OF EXPOSURE AND AGE BY PERIODICALLY WITHDRAWING HAMSTERS FROM EXPOSURE AND MAINTAINING THEM FOR LIFE-SPAN OBSERVATIONS. APPROACH: PHASE I - NEFA AND FLY ASH (FA) WILL BE PREPARED AND CHARACTERIZED. EXPOSURE FACILITIES AND EQUIPMENT WILL BE PREPARED AND TESTED. HAMSTERS WILL BE ORDERED AND QUARANTINED. ACUTE AND SUBACUTE TOXICITY TESTS WITH NEFA AND FA WILL BE CONDUCTED. PHASE II - FOUR GROUPS OF MALE SYRIAN GOLD HAMSTERS WILL RECEIVE HIGH-LEVEL EXPOSURES TO NEFA, LOW-LEVEL EXPOSURES TO NEFA, HIGH-LEVEL EXPOSURES TO FA, AND SHAM EXPOSURES, RESPECTIVELY. EACH GROUP WILL CONSIST OF A SUBGROUP OF 50 ANIMALS TO RECEIVE LIFE-SPAN (15 MONTHS) EXPOSURES, A SUBGROUP OF 20 ANIMALS TO BE SACRIFICED QUARTERLY IN LOTS OF 5, AND ANOTHER SUBGROUP OF 20 ANIMALS TO BE WITHDRAWN FROM EXPOSURE QUARTERLY IN LOTS OF 5 FOR FURTHER OBSERVATION. DEAD ANIMALS WILL BE NECROPSIED. LUNGS AND GROSSLY OBSERVED LESIONS WILL BE HISTOPATHOLOGICALLY EXAMINED.

****PROJECT: 01281-HEALTH EFFECTS OF ENERGY BYPRODUCTS ON DRINKING WATER**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 101976
 TASK CODE=D625F-113 **EPA=R805599-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: DG GREATHOUSE EPA/HERL - CINC
 INVESTIGATOR.: MA SHAPIRO UNIVERSITY OF PITTSBURGH
 AA SOOKY UNIVERSITY OF PITTSBURGH
 JL SYKORA UNIVERSITY OF PITTSBURGH
 JB ANDELMAN UNIVERSITY OF PITTSBURGH

MILESTONES.... 10/78 -PROJECT COMPLETION
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-001281 SSIE-GMA 4372 EPA -R805599-01 TASK-D625F-113
 AP -625F DU -N140 LABT-HEE

ABSTRACT..... THE OBJECTIVES OF THIS STUDY ARE (A) EVALUATION OF SOURCES, PRODUCTION AND UTILIZATION OF COAL-ENERGY-RELATED BYPRODUCTS, (2) EVALUATION OF HEALTH EFFECTS OF COAL ENERGY BYPRODUCTS, (3) EVALUATION OF COAL ENERGY BYPRODUCTS INTRODUCED INTO DRINKING WATER SUPPLIES, (4) EVALUATION OF INFORMATION OBTAINED FROM 1, 2 AND 3 ABOVE TO DEFINE FUTURE RESEARCH NEEDS. THIS STUDY WILL BE BASED ON INFORMATION PUBLISHED IN PERIODICALS, BOOKS, REPORTS OR AVAILABLE RAW DATA. FIVE SEPARATE TASKS WILL COVER ALL THE ESSENTIAL ASPECTS OF SOURCES AND HEALTH EFFECTS OF CONTAMINANTS DERIVED FROM COAL ENERGY PRODUCTION AS WELL AS THE PATHWAYS THROUGH WHICH THEY ENTER DRINKING WATER SUPPLIES. THE CONCLUSIONS OF THE STUDY WILL ALLOW FORMULATION OF FUTURE RESEARCH AND DEVELOPMENT NEEDS IN THE AREA OF COAL ENERGY UTILIZATION AND PRODUCTION AS

****PROJECT: 01282-HEALTH IMPACTS OF ACID MINE DRAINAGE ON DRINKING WATER SUPPLIES IN WESTERN COALS**

STARTING/ COMPLETION DATE : 06/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 157800
 TASK CODE=D625F-114 **EPA=R805579-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: DG GREATHOUSE EPA/HERL - CINC
 INVESTIGATOR.: BG WIXSON UNIVERSITY OF MISSOURI
 BT KAGEY UNIVERSITY OF MISSOURI
 NL GALE UNIVERSITY OF MISSOURI

MILESTONES.... 09/78 -EVALUATION OF LITERATURE AND SAMPLING PLAN FORMULATED
 10/79 -PROJECT COMPLETED
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-001282 SSIE-GMA 4371 EPA -R805579-01 TASK-D625F-114
 AP -625F DU -N140 LABT-HEE

ABSTRACT..... THE OBJECTIVES OF THIS PROJECT ARE: 1. IDENTIFY COAL MINING AREAS IN WESTERN STATES WHERE ACID MINE DRAINAGE MAY GET INTO DRINKING WATER SUPPLIES. 2. CARRY OUT A LITERATURE REVIEW TO IDENTIFY POSSIBLE COMPOUNDS AND LEVELS OF ORGANICS OR INORGANICS THAT MIGHT CAUSE DISEASE. 3. IDENTIFY HEALTH EFFECTS ASSOCIATED WITH THESE COMPOUNDS AND THEIR POSSIBLE INGESTION. 4. DETERMINE, WHERE POSSIBLE, THOSE COMPOUNDS THAT ARE REMOVED BY DRINKING WATER TREATMENT. 5. EVALUATE THE MORTALITY DATA IN RESPECT TO SPECIFIC DISEASE RELATIONSHIP IN THE WESTERN COAL STATES. 6. PROPOSE A REPRESENTATIVE AREA AND SPECIFY THE ANALYTICAL PROCEDURES, WATER CHARACTERISTICS AND TYPE OF EPIDEMIOLOGICAL STUDIES THAT WILL BE NECESSARY TO ESTABLISH VALID BASELINES, DEFINE PROBLEMS AND SEEK POSSIBLE CONTROL MEASURES. THE INFORMATION COLLECTED AND EVALUATED BY THIS PROJECT SHOULD PLAY A MAJOR ROLE IN DETERMINING THE APPROPRIATE AREA FOR CONCENTRATED STUDIES ON THE PROBLEMS OF ACID MINE DRAINAGE-WATER SUPPLIES AND HEALTH. THIS INFORMATION WILL BE CRITICAL TO THE FUTURE DEVELOPMENT OF WESTERN COALS AND ALLOW FOR THE MAXIMUM UTILIZATION OF FUNDS AND RESEARCH TO ANSWER POSSIBLE QUESTIONS OF HEALTH EFFECTS ASSOCIATED WITH ACID MINE DRAINAGE AND DRINKING WATER SUPPLIES.

****PROJECT: 01283-EFFECTS OF ENERGY CONSUMPTION RELATED POLLUTANTS ON PULMONARY FIBROSIS**

STARTING/ COMPLETION DATE : 06/74 - 06/79 : FUNDING : ESTIMATED - FY77 / \$ 105886
 TASK CODE=D625F-115 **EPA=68-03-2005 ** (CNTR.) PRIOR FY76 / \$ 55000

EPA OFFICER.: SD LEE EPA/HERL - CINC
 INVESTIGATOR.: RS BHATNAGAR UNIV OF CALIFORNIA
 MILESTONES.... 06/74 -INITIATE EXPERIMENTS
 06/75 -REPORT ON TOXIC EFFECTS OF PD
 06/76 -REPORT ON TOXIC EFFECTS OF CD AND PT
 09/77 -REPORT ON LUNG ORGAN CULTURE AS A SCREENING SYSTEM (RU, NI, HG,
 09/78 -EFFECTS ON OXIDANTS ON PULMONARY FIBROSIS
 11/79 -FINAL REPORT

PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-001283 SSIE-GMA 4380 EPA -68-03-2005 TASK-D625F-115
 AP -625F DU -N140 LABT-HEE

ABSTRACT..... THERE IS MOUNTING CONCERN OVER THE INCREASE IN ATMOSPHERIC CONCENTRATIONS OF A VARIETY OF METALLIC POLLUTANTS ASSOCIATED WITH ENERGY CONSUMPTION AND CHANGING ENERGY SOURCES. WITH A FEW EXCEPTIONS, VERY LITTLE IS KNOWN ABOUT THE TOXICITY AND LONG RANGE HEALTH EFFECTS OF MANY OF THESE METALS. WE HAVE PREVIOUSLY DEVELOPED A HIGHLY REPRODUCIBLE & CONTROLLABLE LUNG ORGAN CULTURE SYSTEM FOR THE EVALUATION OF SEVERAL ENVIRONMENTAL TOXINS; OUR STUDIES PROVIDED USEFUL INFORMATION CONCERNING THE TOXICITY OF THESE SUBSTANCES AND ALSO YIELDED INFORMATION CONCERNING THE MOLECULAR MECHANISMS INVOLVED IN THESE TOXIC INTERACTIONS LEADING TO PULMONARY DISORDERS. IN OUR ORIGINAL CONTRACT WITH THE EPA, WE EXAMINED THE TOXICITY OF THE METALS PT, PD AND CD AND INITIATED INVESTIGATIONS ON THE EFFECTS OF HG ON PULMONARY TISSUES IN ORGAN CULTURE. BECAUSE OF THE SUITABILITY AND VERSATILITY OF THIS PROCEDURE, WE PROPOSE TO USE OUR LUNG ORGAN CULTURE SYSTEM FOR INVESTIGATING THE BIOCHEMICAL EFFECTS OF THE ENERGY CONSUMPTION-RELATED TRACE METALS, RU, NI, HG, CU AND ZN. WE PROPOSE TO (1) DETERMINE EFFECTS OF THESE TRACE METALS ON PULMONARY CONNECTIVE TISSUE BIOSYNTHESIS USING LUNG ORGAN CULTURES; (2) DETERMINE THE DOSE RESPONSE OF THESE COMPOUNDS; (3) DETERMINE QUALITATIVE AND QUANTITATIVE CHANGES IN COLLAGEN INDUCED BY ABOVE POLLUTANTS (SIMILAR STUDIES WILL BE INITIATED WITH ELASTIN); (4) CORRELATE OBSERVED BIOCHEMICAL CHANGES WITH MORPHOLOGICAL LESIONS; (5) PARAMETERS OF COLLAGEN SYNTHESIS WILL BE EXAMINED IN LUNGS OF RATS EXPOSED TO THE ABOVE POLLUTANTS. AT THE EPA, CINCINNATI. WE WILL ALSO INVESTIGATE THE EFFECT OF CADMIUM ON THE SYNTHESIS OF CONNECTIVE TISSUE MACROMOLECULES. FURTHER STUDIES IN RELATION TO THE METALLIC POLLUTANTS WILL INVOLVE EXAMINATION OF THE INTERACTIONS OF THE TOXINS WITH CRITICAL ENZYMES INVOLVED IN CONNECTIVE TISSUE MACROMOLECULAR SYNTHESIS TO DETERMINE THEIR SITES OF ACTION. STUDIES WILL ALSO BE CARRIED OUT TO DETERMINE THE EFFECT OF THE ABOVE POLLUTANTS ON INFORMATIONAL MACROMOLECULE SYNTHESIS IN LUNG ORGAN CULTURES. THE EFFECTS OF THESE TRACE METALS ON DNA AND RNA SYNTHESIS WILL BE INVESTIGATED.

****PROJECT: 01288-COMPARATIVE TOXICOLOGICAL EVALUATION OF EMISSION FROM POWER PLANTS USING EASTERN VS WESTERN COAL**

STARTING/ COMPLETION DATE : 09/77 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 160000
 TASK CODE=D625F-118 **EPA-68-03-2601 ** (CNTR.) PRIOR FY /

EPA OFFICER.: RM DANNER EPA/HERL - CINC
 INVESTIGATOR.: VN FINELLI UNIVERSITY OF CINCINNATI
 HG PETERING UNIVERSITY OF CINCINNATI
 TE CODY UNIVERSITY OF CINCINNATI
 VJ ELIA UNIVERSITY OF CINCINNATI

MILESTONES....: 10/77 -COLLECTION OF SAMPLES
 02/78 -IN VITRO STUDY
 02/78 -IN VIVO STUDY
 06/78 -COMPLETION

PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-001286 SSIE-GMA 4499 EPA -68-03-2601 TASK-D625F-118
 AP -625F DU -N140 LABT-HEE

ABSTRACT.....: THIS IS ONE OF A MULTI-PART PROJECT WHOSE SUMMARY MAY BE IDENTICAL TO OTHERS. THE INCREASED UTILIZATION OF COAL AS AN ENERGY SOURCE MAY SIGNIFICANTLY ALTER THE POLLUTANT PROFILE IN THE HUMAN ENVIRONMENT. RESERVES OF COAL FAR EXCEED THE KNOWN RESERVES OF ALL OTHER MINERAL FUELS. IN THE UNITED STATES FROM THE ATLANTIC TO THE PACIFIC COASTS THERE ARE GREAT RESERVES OF VARIOUS TYPES OF COAL GRADED FROM THE HIGHEST RANKED PENNSYLVANIA ANTHRACITE AND THE EASTERN AND MIDWESTERN BITUMINOUS TO THE LOW RANKED, SOFTER COALS, WESTER SUBBITUMINOUS AND LIGNITE. THE OBJECTIVES OF THIS RESEARCH ARE: A) TO DETERMINE THE PROFILES OF ORGANIC AND METAL CONSTITUENTS OF EMISSIONS FROM COAL-FIRED POWER PLANTS USING EASTERN OR WESTERN COALS AND TO ANALYZE THE RESULTS IN VIEW OF THE TYPE OF COAL USED AND IN AWARENESS OF THE DIVERSE PLANT DESIGNS AND EMISSION CONTROL DEVICES AT THE VARIOUS COLLECTION SITES; B) TO ASSESS THE TOXICOLOGIC EFFECTS OF COLLECTED EMISSION SAMPLES AND TO COMPARE THE BIOLOGICAL EFFECTS WITH THE CHEMICAL CHARACTERISTICS OF THE SAMPLES. COLLECTION OF EMISSION SAMPLES FROM THE POST-CONTROL-DEVICE COMBUSTION EFFLUENTS (FUGITIVE STACK EMISSION) WILL BE PERFORMED USING UP-TO-DATE SAMPLING METHODOLOGY. METAL ANALYSES, FRACTIONATION AND FINGERPRINTING OF ORGANIC CONSTITUENTS AND IN VIVO AND IN VITRO TOXICOLOGICAL EVALUATION OF UNFRACTIONATED SAMPLES AND THEIR FRACTIONS WILL PERMIT US TO ASSESS THE ROLE OF METALS AND ORGANIC CONSTITUENTS IN THE TOXICITY OF STACK EMISSIONS. THE BIOLOGICAL TESTS PROPOSED IN THIS STUDY INCLUDE BACTERIAL AND MAMMALIAN CELL MUTAGENESIS, CYTOTOXICITY AND LONG AND SHORT TERM EFFECTS OF INTRATRACHEALLY ADMINISTERED SAMPLES AS SEEN BY BIOCHEMICAL AND PATHOLOGICAL CHANGES IN THE LUNGS OF EXPOSED RATS.

****PROJECT: 01288-EFFECT OF POLLUTANTS FROM ENERGY CONSUMPTION AND ENVIRONMENTAL TRACE METALS ON LUNG METABOLISM**

STARTING/ COMPLETION DATE : 06/75 - 06/78 : FUNDING : ESTIMATED - FY77 / \$ 0
 TASK CODE=D625F-130 **EPA-68-03-2221 ** (CNTR.) PRIOR FY76 /

EPA OFFICER.: SD LEE EPA/HERL - CINC
 INVESTIGATOR.: MG MUSTAFA UNIV OF CALIFORNIA SCH OF MED/ANATOMY DEPT
 DF TIERNEY UNIV OF CALIFORNIA SCH OF MED/ANATOMY DEPT
 AD HACKER UNIV OF CALIFORNIA SCH OF MED/ANATOMY DEPT
 JJ OSPITAL UNIV OF CALIFORNIA SCH OF MED/ANATOMY DEPT
 N ELSAYED UNIV OF CALIFORNIA SCH OF MED/ANATOMY DEPT

MILESTONES....: 07/75 -INITIATE EXPERIMENTS
 07/76 -BIOCHEMICAL EFFECTS OF OX EXPOSURE
 09/77 -BIOCHEMICAL METHODS OF ASSESSING POLLUTANT EFFECTS
 12/77 -INFLUENCE OF AGE ON POLLUTANT EFFECTS
 07/78 -FINAL REPORT

PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-001288 SSIE-GMA 4494 EPA -68-03-2221 TASK-D625F-130
 AP -625F DU -N140 LABT-HEE

ABSTRACT.....: THIS IS ONE OF A MULTI-PART PROJECT WHOSE SUMMARY MAY BE IDENTICAL TO OTHERS. THE OBJECTIVE IS TO DETERMINE QUALITATIVE AND QUANTITATIVE BIOCHEMICAL CHANGES IN THE LUNGS OF ANIMALS EXPOSED TO POLLUTANTS RELATED TO ENERGY CONSUMPTION, VIZ., OZONE, NITROGEN OXIDES, SULFUR OXIDES, SULFURIC ACID, SULFATES AND ENVIRONMENTAL TRACE METALS. ANIMALS (RATS) ARE EXPOSED TO POLLUTANTS AND THE EFFECTS IN THE LUNG ARE DELINEATED USING SENSITIVE BIOCHEMICAL PARAMETERS. THE FINDINGS OF STUDIES TO DATE ARE SUMMARIZED AS FOLLOWS. ALTHOUGH ACUTE EXPOSURES TO OXIDANT POLLUTANTS GENERALLY CAUSE A DEPRESSION OF LUNG ENZYMATIC ACTIVITIES, EXPOSURES OF OZONE AT CONCENTRATIONS BELOW 1 PPM (SIMULATING AMBIENT CONDITIONS IN PHOTOCHEMICAL SMOG) AND TO NITROGEN DIOXIDE AT 5 PPM (THRESHOLD LIMIT VALUE) FOR A FEW DAYS OR LONGER RESULT IN A STIMULATION OF LUNG METABOLISM. AS JUDGED FROM ENZYMATIC ACTIVITIES, LUNG METABOLISM MAY EXHIBIT AN INITIAL DEPRESSION (WITHIN 24 HOURS) BUT A SUBSEQUENT ELEVATION WHICH ATTAINS THE PEAK BETWEEN 3 AND 4 DAYS OF EXPOSURE. FOR EXPOSURES INVOLVING 0.8 PPM OZONE, A 50-100% ELEVATION OF METABOLIC PARAMETERS HAS BEEN OBSERVED. FOR LOWER LEVELS OF OZONE (VIZ., 0.5 AND 0.2 PPM) THE METABOLIC CHANGES ARE SMALL, EXHIBITING PROLONGED EXPOSURES TO OZONE (VIZ., 0.8 PPM), AND SHOW THAT THE BIOCHEMICAL CHANGES IN THE LUNG REMAIN ELEVATED FOR AS LONG AS 50 DAYS OF EXPOSURE, BUT THEN DECLINE ALMOST TO CONTROL LEVEL AFTER 90 DAYS OF EXPOSURE. FOR LOWER LEVELS OF OZONE, THE CHANGES ARE FOUND TO REVERT TO CONTROL LEVEL WITHIN 20 DAYS OF EXPOSURE. IF THE EXPOSURE IS DISCONTINUED AFTER A FEW DAYS, THE BIOCHEMICAL CHANGES IN RECOVERING ANIMALS RETURN TO CONTROL LEVELS WITHIN A WEEK. IT MAY BE CONCLUDED THAT LOW-LEVEL OXIDANT EXPOSURES CAUSE BIOCHEMICAL CHANGES IN THE LUNG, AND THAT THE CHANGES ARE REVERSIBLE.

****PROJECT: 02688-ENZYMATIC CHARACTERIZATION OF METABOLIC ACTIVATION AND DNA BINDING OF PRESUMPTIVE CARCINOGENS IN SHORT-TERM ASSAY SYSTEMS (ABBREV)**

STARTING/ COMPLETION DATE : 09/77 - 09/79 : FUNDING : ESTIMATED - FY77 / \$ 89954
 TASK CODE=H625F-7140 **EPA=R805482-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: J HUISINGH EPA/HERL - RTP
 INVESTIGATOR.: IB WEINSTEIN COLUMBIA UNIV COL OF PHYS & SURGEONS/PEDIATRICS
 D GRUNBERGER COLUMBIA UNIV COL OF PHYS & SURGEONS/PEDIATRICS
 AM JEFFREY COLUMBIA UNIV COL OF PHYS & SURGEONS/PEDIATRICS
 H YAMASAKI COLUMBIA UNIV COL OF PHYS & SURGEONS/PEDIATRICS
 RP SANTELLA COLUMBIA UNIV COL OF PHYS & SURGEONS/PEDIATRICS

PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-002688 SSIE-GMA 4832 EPA -R805482-01 TASK-H625F-7140
 AP -625F DU -N140 LABT-HEE

ABSTRACT.....: THIS IS ONE OF A MULTI-PART PROJECT WHOSE SUMMARY MAY BE IDENTICAL TO OTHERS. IT IS NOW RECOGNIZED THAT ANIMAL BIOASSAYS ARE INADEQUATE FOR MONITORING THE THOUSANDS OF ENVIRONMENTAL AGENTS WHICH REQUIRE SCREENING AS POSSIBLE CARCINOGENS. SEVERAL SHORT-TERM IN VITRO TESTS FOR MUTAGENICITY AND CARCINOGENICITY ARE CURRENTLY BEING EVALUATED (BY GOVERNMENTAL AGENCIES, PRIVATE INDUSTRY AND VARIOUS RESEARCH GROUPS). SINCE MANY ENVIRONMENTAL MUTAGENS AND CARCINOGENS REQUIRE PRIOR METABOLISM OR WHOLE CELLS TO EXERT THEIR EFFECTS, SOME OF THESE SHORT-TERM ASSAYS USE A RAT LIVER MICROSOMAL FRACTION FOR ACTIVATION OF THE CHEMICAL BEING TESTED. THERE IS A PAUCITY OF INFORMATION, HOWEVER, ON WHETHER OR NOT THE ACTIVATION OF A KNOWN CARCINOGEN AND ITS COVALENT BINDING TO CELLULAR DNA IN THESE IN VITRO SYSTEMS IS QUANTITATIVELY AND QUALITATIVELY SIMILAR TO THAT WHICH OCCURS IN INTACT MAMMALIAN CELLS, OR IN THE WHOLE ANIMAL. THE OBJECTIVE OF THIS PROPOSAL IS TO EXAMINE THE MODIFIED DNA FROM CELLS USED IN THESE ASSAYS AFTER EXPOSURE TO THE UBIQUITOUS CARCINOGEN BENZO(A)PYRENE (BP). THE APPROACH WILL BE TO INCUBATE TRITIUM LABELED BP WITH MICROSOMES AND SALMONELLA TYPHIMURIUM TESTER STRAINS, OR WITH VARIOUS MAMMALIAN CELL LINES. CELLULAR DNA WILL THEN BE EXTRACTED, ANALYZED FOR RADIOACTIVITY AND FLUORESCENCE, AND THEN HYDROLYZED TO NUCLEOSIDES WHICH WILL BE ANALYZED BY HIGH PRESSURE LIQUID CHROMATOGRAPHY, UTILIZING APPROPRIATE BP-NUCLEOSIDE DERIVATIVES PREPARED CHEMICALLY AS MARKERS TO DETERMINE THE NATURE OF THE BP-NUCLEOSIDE ADDUCTS PRESENT. PARALLEL ASSAYS WILL BE DONE FOR MUTAGENICITY AND TRANSFORMATION AND OF ARYL HYDROCARBON HYDROXYLASE AND EPOXIDE HYDRATASE ACTIVITIES. THE DATA WILL BE CORRELATED WITH OUR RESULTS OBTAINED IN INTACT HUMAN TISSUES WHERE IT HAS BEEN POSSIBLE TO DETERMINE THE STRUCTURE OF THE MAJOR ADDUCT FORMED.

****PROJECT: 02689-IMPLEMENTATION OF SCREENING TESTS FOR POTENTIALLY HAZARDOUS AIRBORNE PARTICULATE MATERIALS USING THE ALVEOLAR MACROPHAGE TEST SYS**

STARTING/ COMPLETION DATE : 10/76 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 350000
 TASK CODE=H625F-7150 **EPA=68-02-2566 ** (CNTR.) PRIOR FY /

EPA OFFICER.: MD WATERS EPA/HERL - RTP
 INVESTIGATOR.: JA CAMPBELL NORTHROP SERVICES INC
 J HUISINGH US EPA
 MD WATERS US EPA

MILESTONES...: 09/77 -EVALUATE ATP AS A BIO-INDICATOR OF TOXICITY IN EFFLUENTS
 08/77 -TEST EFFLUENTS FROM FLUIDIZED BED COMBUSTION PILOT STUDY
 10/77 -TEST EFFLUENT FROM COAL GASIFICATION PILOT STUDY

PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-002689 SSIE-GMA 4296 EPA -68-02-2566 TASK-H625F-7150
 AP -625F DU -N140 LABT-HEE

ABSTRACT.....: STUDIES IN THIS AND OTHER LABORATORIES HAVE DEFINED A CENTRAL ROLE FOR THE ALVEOLAR MACROPHAGE IN THE DEFENSE OF THE LUNG AGAINST INHALED PARTICULATE MATERIALS. WE HAVE IDENTIFIED A NUMBER OF METALLIC SUBSTANCES OF THE TYPE KNOWN TO BE PRESENT IN AIR EFFLUENTS WHICH ARE RELATIVELY TOXIC FOR THE ALVEOLAR MACROPHAGE (CD, V, NI, HG, ETC.). MANY SUBSTANCES SUCH AS SOME METALS AND CERTAIN ORGANICS ARE EMITTED IN THE VAPOR PHASE AND SUBSEQUENTLY PREFERENTIALLY CONDENSE ON THE SURFACE OF THE SMALLER RESPIRABLE PARTICULATE MATERIALS. WE NOW HAVE A NUMBER OF CHEMICAL ANALYTICAL TECHNIQUES AND BIOLOGICAL ENDPOINTS AVAILABLE TO STUDY THE NATURE OF THE SURFACES OF PARTICLES AND THE RESULTING EFFECTS OF THE IN VITRO EXPOSURE OF THESE PARTICLES TO ALVEOLAR MACROPHAGE. THE BIOLOGICAL ENDPOINTS FORM THE BASIS OF A VALUABLE SCREENING SYSTEM FOR POTENTIALLY HAZARDOUS AIRBORNE PARTICULATE MATERIALS. IN COLLABORATION WITH ANALYTICAL CHEMISTS WHO ARE ABLE TO DEFINE THE SURFACE CHEMICAL PROPERTIES OF PARTICULATE SAMPLES, WE WILL CARRY OUT A SYSTEMATIC SCREENING EFFORT TO DEFINE THE BIOLOGICAL RESPONSE OF THE ALVEOLAR MACROPHAGE TO PHAGOCYTIZED PARTICLES IN VITRO. WE WILL FOCUS ON THE PROPENSITY OF CRUDE PARTICLES TO PROMOTE CELL LYSIS, TO AFFECT PHAGOCYTTIC ACTIVITY (AS DETERMINED BY DEPRESSION IN ADENOSINE TRIPHOSPHATE LEVELS), TO ALTER THE INTEGRITY OF THE LYSOSOMES AND TO INDUCE ENZYME SYSTEMS CAPABLE OF ACTIVATING POTENTIALLY CARCINOGENIC COMPOUNDS SUCH AS THE POLYNUCLEAR AROMATICS WHICH MAY BE ADSORBED TO PARTICULATE SURFACES. WE WILL STUDY THE INFLUENCE OF THE NATURE OF THE SURFACE OF STANDARD PARTICLES ON THE EXTENT OF ADSORPTION OF MATERIALS. FURTHERMORE, WE WILL STUDY THE INFLUENCE OF INTERNAL AND EXTERNAL SURFACE AREA ON THE TIME COURSE OF RELEASE OF ADSORBED COMPONENTS AND THE EFFECTS OF SURFACE CHEMICAL COMPONENTS ON THE BIOLOGIC

****PROJECT: 02691-IMPROVED SCORING OF CHEMICAL TRANSFORMATION OF C3H/10T1/2 CELLS**

STARTING/ COMPLETION DATE : 10/77 - 09/80 : FUNDING : ESTIMATED - FY77 / \$ 270000
 TASK CODE=H625F-7153 **EPA=R805208 ** (GRANT) PRIOR FY /

EPA OFFICER.: MD WATERS EPA/HERL - RTP
 INVESTIGATOR.: C HEIDELBERGER UNIV OF SO CALIF
 S MONDAL UNIV OF SO CALIF
 RF BAKER UNIV OF SO CALIF

MILESTONES...: 08/77 -PROJECT TO BE FUNDED
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-N-002691 SSIE-GMA 4325 EPA -R805208 TASK-H625F-7153
 AP -625F DU -N140 LABT-HEE

ABSTRACT.....: WE PLAN TO IMPROVE THE QUANTITATIVE ONCOGENIC TRANSFORMATION BY CHEMICAL CARCINOGENS AND SCORE FOR TRANSFORMATION AT EARLIER TIMES SO THAT THE SYSTEM CAN BE USEFUL AS A RAPID PRE-SCREEN FOR ENVIRONMENTAL POLLUTION. INDIVIDUAL COMPOUNDS, AS WELL AS MIXTURES, WILL BE STUDIED. THE USE OF SINGLE CELLS IN INDIVIDUAL DISHES AS THE BASIC SYSTEM WILL BE IMPROVED. AND THE INHIBITORY INFLUENCE OF CELL DENSITY ON TRANSFORMATION FREQUENCY WILL BE ACCURATELY QUANTITATED. TRANSFORMED C3H/10T1/2 CELLS HAVE A DIFFERENT MORPHOLOGY IN THE SCANNING ELECTRON MICROSCOPE. THIS PROPERTY WILL BE USED TO DEVELOP AN ALTERNATIVE ASSAY FOR TRANSFORMATION AND TO DETERMINE AT WHAT TIME AFTER CARCINOGEN TREATMENT CELLS BECOME TRANSFORMED.

****PROJECT: 02692-WORKSHOP ON "SCREENING SYSTEMS FOR ALTERNATE ENERGY EFFLUENTS"**

STARTING/ COMPLETION DATE : 11/77 - 01/78 : FUNDING : ESTIMATED - FY77 / \$ 20000
 TASK CODE=H625F-7154 **EPA=68-02-2435 ** (CNTR.) PRIOR FY /

EPA OFFICER.: MD WATERS EPA/HERL - RTP
 INVESTIGATOR.: MD WATERS KAPPA SYSTEMS INC
 MD WATERS US EPA
 W MARTIN KAPPA SYSTEMS INC

MILESTONES...: 11/77 -WORKSHOP TO BE HELD
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-N-002692 SSIE-GMA 4484 EPA -68-02-2435 TASK-H625F-7154
 AP -625F DU -N140 LABT-HEE

ABSTRACT.....: THERE ARE PRESENTLY ONLY A LIMITED NUMBER OF INDIVIDUALS ACTUALLY INVOLVED IN THE BIOLOGICAL IDENTIFICATION (SCREENING) OF POTENTIALLY HAZARDOUS EFFLUENTS RESULTING FROM THE UTILIZATION OF ALTERNATE SOURCES OF ENERGY. IT WOULD BE HIGHLY ADVANTAGEOUS TO ASSEMBLE THOSE INDIVIDUALS INVOLVED IN THE DEVELOPMENT AND UTILIZATION OF BIOLOGICAL SCREENING METHODS FOR DETECTION OF MUTAGENS, CARCINOGENS AND CYTOTOXIC AGENTS DERIVED FROM ALTERNATE ENERGY SOURCES IN A WORKSHOP. REPRESENTATIVES OF "USER" GROUPS SHOULD BE PRESENT TO ESTABLISH THE FEASIBILITY OF AN INTERDISCIPLINARY EFFORT.

****PROJECT: 02693-DEVELOPMENT OF AUTOMATED BEHAVIORAL TESTING METHODOLOGIES FOR STUDY OF EFFECTS OF COAL CONVERSION AND UTILIZATION PRODUCTS**

STARTING/ COMPLETION DATE : 10/76 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 124000
 TASK CODE=H625F-7155 **EPA=68-02-2288 ** (CNTR.) PRIOR FY /

EPA OFFICER.: LW REITER EPA/HERL - RTP
 INVESTIGATOR.: UNKNOWN IOWA STATE UNIV OF SCI & TECH GRADUATE SCH
 MILESTONES...: 05/77 -INSTALL COMPUTER SYSTEM
 04/78 -DEVELOP SOFTWARE FOR BEHAVIOR IDENTIFICATION
 05/78 -TEST SYSTEM WITH AGENTS
 09/78 -FINAL REPORT

PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-N-002693 SSIE-GMA 4492 EPA -68-02-2288 TASK-H625F-7155
 AP -625F DU -N140 LABT-HEE

ABSTRACT.....: THE HEALTH EFFECTS RESEARCH LABORATORY OF EPA WILL EVALUATE THE TOXICITY OF COAL CONVERSION AND UTILIZATION PRODUCTS. AS PART OF THIS EFFORT, THE ADVERSE BIOLOGICAL EFFECTS OF THESE PRODUCTS ON THE NERVOUS SYSTEM OF PRIMATES MUST BE STUDIED. USING BEHAVIOR AS AN INDEX, THE FUNCTIONAL INTEGRITY OF THE NERVOUS SYSTEM CAN BE MEASURED. THIS DATA WILL PROVIDE A DATA BASE IN SUPPORT OF THE AGENCY'S REGULATORY POLICY. THIS CONTRACT WITH IOWA STATE UNIVERSITY WILL PROVIDE FOR THE DEVELOPMENT OF TESTING PROCEDURE WHICH WILL PROVIDE RAPID, BUT SENSITIVE EVALUATION OF PRIMATE BEHAVIOR. THE MAIN OBJECTIVE OF THE STUDY IS TO DEVELOP AUTOMATED TESTING PROCEDURES UTILIZING A MINICOMPUTER, CLOSED-CIRCUIT TV EQUIPMENT AND APPROPRIATE HARDWARE INTERFACES TO COLLECT AND ANALYZE PRIMATE BEHAVIOR IN THE REAL-TIME LABORATORY ENVIRONMENT. TASK 1 (PATTERN RECOGNITION OF SPONTANEOUS BEHAVIOR IN MONKEYS) WILL DEFINE AND ANALYZE THE MOTOR ITEMS COMPRISING THE ANIMALS' SPONTANEOUS ACTIVITY. TASK 2 (LEARNING/MEMORY EVALUATION) WILL DEVELOP COMPUTER PROGRAM STIMULUS PRESENTATION, RESPONSE ACQUISITION AND DATA ANALYSIS

****PROJECT: 02695-ENZYMATIC CHARACTERIZATION OF METABOLIC ACTIVATION AND DNA BINDING OF PRESUMPTIVE CARCINOGENS IN SHORT-TERM ASSAY SYSTEMS (ABBREV)**

STARTING/ COMPLETION DATE : 09/77 - 09/80 : FUNDING : ESTIMATED - FY77 / \$ 90000
 TASK CODE=H625F-7156 **EPA-68-02-2231 ** (CNTR.) PRIOR FY /

EPA OFFICER.: JL HUISINGH EPA/HERL - RTP
 INVESTIGATOR.: IB WEINSTEIN COLUMBIA UNIV
 D GRUNBERGER COLUMBIA UNIV COL OF PHYS & SURGEONS/PEDIATRICS
 AM JEFFREY COLUMBIA UNIV COL OF PHYS & SURGEONS/PEDIATRICS
 JL HUISINGH US EPA COL OF PHYS & SURGEONS/PEDIATRICS

MILESTONES.... 09/77 -INITIATE PROJECT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-002695 SSIE-GMA 4289 EPA -68-02-2231 TASK-H625F-7156
 AP -625F DU -N140 LABT-HEE

ABSTRACT..... IT IS NOW RECOGNIZED THAT ANIMAL BIOASSAYS ARE INADEQUATE FOR MONITORING THE THOUSANDS OF ENVIRONMENTAL AGENTS WHICH REQUIRE SCREENING AS POSSIBLE CARCINOGENS. SEVERAL SHORT-TERM IN VITRO TESTS FOR MUTAGENICITY AND CARCINOGENICITY ARE CURRENTLY BEING EVALUATED (BY GOVERNMENTAL AGENCIES, PRIVATE INDUSTRY AND VARIOUS RESEARCH GROUPS). SINCE MANY ENVIRONMENTAL MUTAGENS AND CARCINOGENS REQUIRE PRIOR METABOLISM OR WHOLE CELLS TO EXERT THEIR EFFECTS, SOME OF THESE SHORT-TERM ASSAYS USE A RAT LIVER MICROSOMAL FRACTION FOR ACTIVATION OF THE CHEMICAL BEING TESTED. THERE IS A PAUCITY OF INFORMATION, HOWEVER, ON WHETHER OR NOT THE ACTIVATION OF A KNOWN CARCINOGEN AND ITS COVALENT BINDING TO CELLULAR DNA IN THESE IN VITRO SYSTEMS IS QUANTITATIVELY AND QUALITATIVELY SIMILAR TO THAT WHICH OCCURS IN INTACT MAMMALIAN CELLS, OR IN THE WHOLE ANIMAL. THE OBJECTIVE OF THIS PROPOSAL IS TO EXAMINE THE MODIFIED DNA FROM CELLS USED IN THESE ASSAYS AFTER EXPOSURE TO THE UBIQUITOUS CARCINOGEN BENZO(A)PYRENE (BP). THE APPROACH WILL BE TO INCUBATE TRITIUM LABELED BP WITH MICROSOMES AND SALMONELLA TYPHIMURIUM TESTER STRAINS, OR WITH VARIOUS MAMMALIAN CELL LINES. CELLULAR DNA WILL THEN BE EXTRACTED, ANALYZED FOR RADIOACTIVITY AND FLUORESCENCE, AND THEN HYDROLYZED TO NUCLEOSIDES WHICH WILL BE ANALYZED BY HIGH-PRESSURE LIQUID CHROMATOGRAPHY, UTILIZING APPROPRIATE BP-NUCLEOSIDE DERIVATIVES PREPARED CHEMICALLY AS MARKERS TO DETERMINE THE NATURE OF THE BP-NUCLEOSIDE ADDUCTS PRESENT. PARALLEL ASSAYS WILL BE DONE FOR MUTAGENICITY AND TRANSFORMATION OF ARYL HYDROCARBON HYDROXYLASE AND EPOXIDE HYDRATASE ACTIVITIES. THE DATA WILL BE CORRELATED WITH OUR RESULTS OBTAINED IN INTACT HUMAN TISSUES WHERE IT HAS BEEN POSSIBLE TO DETERMINE THE STRUCTURE OF THE MAJOR ADDUCT FORMED. THIS APPLICATION DOES NOT INVOLVE RECOMBINANT DNA.

****PROJECT: 02696-STUDIES ON THE RELATIONSHIP BETWEEN CARCINOGEN METABOLISM IN THE ALVEOLAR MACROPHAGE AND THE INDUCTION OF LUNG CANCER**

STARTING/ COMPLETION DATE : 12/76 - 11/80 : FUNDING : ESTIMATED - FY77 / \$ 350000
 TASK CODE=H625F-7157 **EPA-68-02-2566 ** (CNTR.) PRIOR FY /

EPA OFFICER.: MD WATERS EPA/HERL - RTP
 INVESTIGATOR.: N GARRETT NORTHROP SERVICES INC

MILESTONES.... 07/77 -IMPLEMENT MICROBIAL MUTAGENESIS AS AN INDICATOR OF MACROPHAGE MET
 09/77 -PROCURE MACROPHAGES FROM SEVERAL RODENT SPECIES FOR EVALUATION OF
 11/77 -UTILIZATION OF MICROBIAL MUTAGENESIS IN SCREENING FOR CARCINOGENE S1
 01/78 -EXPOSE MACROPHAGES IN CULTURE TO CARCINOGENS

PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-002696 SSIE-GMA 4297 EPA -68-02-2566 TASK-H625F-7157
 AP -625F DU -N140 LABT-HEE

ABSTRACT..... THE OBJECTIVE OF THIS TASK IS TO STUDY THE RELATIONSHIP BETWEEN CARCINOGEN METABOLISM IN THE ALVEOLAR MACROPHAGE AND THE INDUCTION OF LUNG CANCER. USING IN VITRO METHODS THE COURSE OF METABOLIC ACTIVATION/ DETOXIFICATION OF PROCARCINOGENS WILL BE INVESTIGATED IN ALVEOLAR MACROPHAGES OBTAINED FROM RATS AND HAMSTERS. BIOCHEMICAL METHODS WILL BE USED IN MONITORING INDUCTION OF METABOLIC ACTIVATION/DETOXIFICATION SYSTEMS. MICROBIAL MUTAGENESIS WILL BE USED TO MONITOR THE EXTENT OF METABOLIC ACTIVATION/DETOXIFICATION BY MACROPHAGES. ONCE THE CONDITIONS FOR MAXIMAL ACTIVATION/DETOXIFICATION OF CARCINOGENS HAVE BEEN ESTABLISHED USING IN VITRO METHODS, WHOLE ANIMAL STUDIES WILL BE INITIATED EMPLOYING INTRATRACHEAL INSTILLATION TECHNIQUES TO ADMINISTER PARTICULATES AND APPROPRIATE PROCARCINOGENS. THE METABOLIC ACTIVATION OF PROCARCINOGENS WILL BE MONITORED AS DESCRIBED ABOVE USING MACROPHAGES OBTAINED BY SALINE LAVAGE OF CARCINOGEN-EXPOSED ANIMALS. WHEN OPTIMAL CONDITIONS HAVE BEEN ESTABLISHED, EXPERIMENTS WILL BE PERFORMED TO DEMONSTRATE THE RELATIONSHIP BETWEEN ELICITATION OF MACROPHAGE INFLUX, METABOLIC ACTIVATION/DETOXIFICATION OF CARCINOGENS AND THE INDUCTION OF LUNG TUMORS IN ANIMALS. THIS IS A LONG-RANGE PROJECT THAT WILL BE APPROACHED SEQUENTIALLY WITH CONTINUATION FROM YEAR TO YEAR BEING DEPENDENT UPON DEMONSTRATED SUCCESS OF

****PROJECT: 02698-EFFECTS OF SULFURIC ACID AEROSOL UPON RESPIRATORY FUNCTION IN NORMAL HUMAN SUBJECTS**

STARTING/ COMPLETION DATE : 11/76 - 12/79 : FUNDING : ESTIMATED - FY77 / \$ 230000
 TASK CODE=H625F-7160 **EPA-R804B03 ** (GRANT) PRIOR FY /

EPA OFFICER.: ED HAAK EPA/HERL - RTP
 INVESTIGATOR.: MD KERR UNIV OF MARYLAND DEPT OF MED
 ML MCILHANY UNIV OF MARYLAND DEPT OF MED
 P SWIDERSKY UNIV OF MARYLAND DEPT OF MED
 T KULLE JOHNS HOPKINS UNIV
 D SWIFT JOHNS HOPKINS UNIV

MILESTONES.... 06/78 -1ST PHASE CLINICAL STUDIES REPORTED
 06/79 -2ND PHASE CLINICAL STUDIES REPORTED
 06/80 -3RD PHASE CLINICAL STUDIES REPORTED

PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-002698 SSIE-GMA 3542 EPA -R804B03 TASK-H625F-7160
 AP -625F DU -N140 LABT-HEE

ABSTRACT..... OBJECTIVES: TO DETERMINE THE EFFECTS OF LOW CONCENTRATION (100 MICROGRAMS/CUBIC METER) H2SO4 AEROSOL OF SMALL PARTICLE SIZE (0.1-0.3 MICROGRAM) ON THE MECHANICAL FACTORS OF BREATHING IN NORMAL HUMAN SUBJECTS. APPROACH: A MODIFIED DOUBLE-BLIND STUDY IS PLANNED. SUBJECTS WILL BE STUDIED IN PAIRS AND WILL SPEND 6 HOURS DAILY IN A CLASS 100 ENVIRONMENTALLY CONTROLLED CHAMBER ON 3 SUCCESSIVE DAYS. THEY WILL NOT BE TOLD WHICH DAY THE 4-HOUR EXPOSURE TO H2SO4 AEROSOL WILL OCCUR NOR WHICH 2 DAYS THEY WILL SIMPLY BREATHE FILTERED CLEAN AIR. PULMONARY FUNCTION TESTS WILL BE DONE IMMEDIATELY BEFORE ENTERING THE CHAMBER AND EVERY 2 HOURS THEREAFTER. OUTPUT: SMOKERS AND NON-SMOKERS WILL BE STUDIED. PULMONARY FUNCTION TESTS WILL INCLUDE THE FOLLOWING: (A) SPIROMETRY, (B) PLETHYSMOGRAPHIC DETERMINATION OF SPECIFIC AIRWAY CONDUCTANCE AND FRC, (C) CLOSING VOLUME AND NITROGEN PLATEAU, AND (D) DYNAMIC COMPLIANCE.

****PROJECT: 02700-THE EFFECT OF LOW LEVELS OF SULFURIC ACID MIST EXPOSURE ON HUMAN PULMONARY FUNCTION**

STARTING/ COMPLETION DATE : 01/76 - 12/79 : FUNDING : ESTIMATED - FY77 / \$ 230000
 TASK CODE=H625F-7161 **EPA-RB04853 ** (GRANT) PRIOR FY /

EPA OFFICER : ED HAAK EPA/HERL - RTP
 INVESTIGATOR : SM HORVATH UNIVERSITY OF CALIFORNIA
 LJ FOLINSBEE UNIVERSITY OF CALIFORNIA
 JF BEDI UNIVERSITY OF CALIFORNIA

MILESTONES... : 06/78 -1ST ANNUAL REPORT ON HUMAN STUDIES PLANNED FOR THAT YEAR
 06/79 -2ND ANNUAL REPORT ON HUMAN STUDIES PLANNED FOR THAT YEAR
 06/80 -3RD ANNUAL REPORT ON HUMAN STUDIES PLANNED FOR THAT YEAR

PLAN ID..... : (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... : REC-N-002700 SSIE-GMA 4324 EPA -RB04853 TASK-H625F-7161
 AP -625F DU -N140 LABT-HEE

ABSTRACT..... : OBJECTIVE: THE AIM OF THIS INVESTIGATION IS TO EXAMINE THE EFFECTS OF ACUTE EXPOSURE TO H2SO4 MIST IN HUMANS AND SOME OF THE FACTORS AFFECTING TOXICITY--TEMPERATURE, HUMIDITY, AND DURATION OF EXPOSURE. APPROACH: THE SUBJECTS WILL BE EXPOSED IN AN ENVIRONMENTAL CHAMBER TO EITHER FILTERED AIR .20 MG/CUBIC METER OR .40 MG/M CUBIC METER OF H2SO4 UNDER FOUR CONDITIONS OF TEMPERATURE AND HUMIDITY: 18 DEGREES C, 45% RH; 35 DEGREES C, 85% RH; 35 DEGREES C, 45%RH; AND 35 DEGREES C, 88% RH. SUBJECTS WILL EXERCISE INTERMITTENTLY AT 25% OF THEIR MAXIMUM CAPACITY DURING THE EXPOSURE PERIOD. PULMONARY FUNCTION TESTS WILL BE PERFORMED BEFORE, DURING, AND AFTER THE EXPOSURE. SOME ASPECTS OF CARDIOVASCULAR PERFORMANCE WILL BE ASSESSED DURING THE EXPOSURE EXERCISE PERIODS. OUTPUT: THE FINAL REPORT OF THIS STUDY WILL PROVIDE THE AGENCY WITH IMPORTANT INFORMATION ON THE EFFECTS OF ACID AEROSOL EXPOSURE IN

****PROJECT: 02702-EFFECT OF COAL GASIFICATION PRODUCTS ON THE PULMONARY DEFENSE SYSTEM AGAINST INFECTIOUS DISEASE (BACTERIAL)**

STARTING/ COMPLETION DATE : 03/77 - 02/80 : FUNDING : ESTIMATED - FY77 / \$ 150000
 TASK CODE=H625F-7162 **EPA-RB05317 ** (GRANT) PRIOR FY76 /

EPA OFFICER : JA GRAHAM EPA/HERL - RTP
 INVESTIGATOR : C ARANYI I I T RES INST

MILESTONES... : 08/77 -AWARD GRANT, PROVIDE 1ST TEST SAMPLE
 08/78 -COMPLETE ACUTE EXPOSURES OF 1ST TEST SAMPLE
 08/78 -SUBMIT ANNUAL REPORT
 08/79 -COMPLETE ACUTE EXPOSURES OF SECOND TEST SAMPLE
 10/79 -SUBMIT ANNUAL REPORT
 08/80 -COMPLETE CHRONIC EXPOSURES
 10/80 -SUBMIT FINAL REPORT

PLAN ID..... : (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... : REC-N-002702 SSIE-GMA 4326 EPA -RB05317 TASK-H625F-7162
 AP -625F DU -N140 LABT-HEE

ABSTRACT..... : THE IMPACT OF POLLUTANTS FROM ALTERNATE ENERGY SOURCES (PRIMARILY COAL GASSIFICATION) ON PULMONARY DEFENSE SYSTEMS AGAINST INFECTIOUS BACTERIAL DISEASE WILL BE INVESTIGATED. ANIMALS WILL BE EXPOSED TO RESPIRABLE-SIZED AEROSOLS OF THE POLLUTANT IN A MANNER TO ELUCIDATE DOSE RESPONSE RELATIONSHIPS. THE FOLLOWING PARAMETERS WILL BE USED IN THE INVESTIGATION: (1) MORTALITY AND MEAN SURVIVAL TIME FOLLOWING AEROSOLS OF PATHOGENIC BACTERIA; (2) PULMONARY BACTERICIDAL RESPONSES; (3) PULMONARY CELL POPULATIONS; AND (4) FUNCTIONING OF ALVEOLAR MACROPHAGES. IF ADVERSE EFFECTS ARE FOUND, THE INFLUENCE OF PARTICLE SIZE AND DURATION OF EXPOSURE WILL BE TESTED USING THE MOST SENSITIVE PARAMETERS. THE TIME REQUIRED FOR RECOVERY FROM ADVERSE EFFECTS WILL ALSO BE DETERMINED.

****PROJECT: 02704-TO DETERMINE EFFECTS OF POLLUTANTS FROM ALTERNATE ENERGY SOURCES ON PULMONARY ANTIVIRAL MECHANISMS**

STARTING/ COMPLETION DATE : 02/77 - 01/80 : FUNDING : ESTIMATED - FY77 / \$ 270000
 TASK CODE=H625F-7163 **EPA-RB05049 ** (GRANT) PRIOR FY76 /

EPA OFFICER : JA GRAHAM EPA/HERL - RTP
 INVESTIGATOR : L SCHIFF I I T RES INST

MILESTONES... : 08/77 -COMPLETE H2SO4 AND CARBON EXPOSURE, WITH AND WITHOUT VIRUS
 01/79 -COMPLETE STUDIES ON POLLUTANT SAMPLE
 06/79 -COMPLETE STUDIES TO DETERMINE THE EFFECTS OF VIRUS
 02/80 -COMPLETE STUDIES OF THE INTERACTION OF VIRUS AND POLLUTANT

PLAN ID..... : (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... : REC-N-002704 SSIE-GMA 3547 EPA -RB05049 TASK-H625F-7163
 AP -625F DU -N140 LABT-HEE

ABSTRACT..... : THE OBJECTIVE OF THIS PROJECT IS TO DETERMINE THE TOXICITY OF EFFLUENTS FROM ALTERNATE ENERGY SOURCES ON THE RESPIRATORY EPITHELIUM DURING AND AFTER EXPOSURE TO INFECTIOUS AGENTS (INFLUENZA VIRUS). WHOLE TRACHEAL ORGAN CULTURES FROM 2-4 DAY OLD AND 4 WEEK OLD HAMSTERS WILL BE EXPOSED IN VITRO TO THE APPROPRIATE POLLUTANTS, WITH AND WITHOUT INFLUENZA VIRUS. THE PARAMETERS TO BE MEASURED INCLUDE: (1) CILIARY ACTIVITY AS OBSERVED BY LIGHT MICROSCOPY; (2) VIRAL REPLICATION AND INTERFERON PRODUCTION; (3) CELLULAR SITES AND DISTRIBUTION OF VIRAL REPLICATION; AND (4) CYTOPATHOLOGIC CHANGES OF THE EPITHELIUM USING LIGHT, TRANSMISSION AND SCANNING ELECTRON MICROSCOPY. ONCE ADVERSE EFFECTS ARE FOUND, STUDIES WILL ELUCIDATE DOSE-RESPONSE RELATIONSH

****PROJECT: 02706-APPLICATION OF AUTOMATED BEHAVIORAL TESTING SYSTEM TO MONKEYS EXPOSED TO COAL CONVERSION POLLUTANTS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 250000
 TASK CODE=H625F-7165 **EPA-68-02-2288 ** (CNTR.) PRIOR FY /

EPA OFFICER.: LW REITER EPA/HERL - RTP
 INVESTIGATOR.: UNKNOWN IOWA STATE UNIV OF SCI & TECH GRADUATE SCH
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES.: RECN-002706 SSIE-GMA 4700 EPA -68-02-2288 TASK-H625F-7165
 AP -625F DU -N140 LABT-HEE

ABSTRACT..... THE HEALTH EFFECTS RESEARCH LABORATORY OF EPA WILL EVALUATE THE TOXICITY OF COAL CONVERSION AND UTILIZATION PRODUCTS. AS PART OF THIS EFFORT, THE ADVERSE BIOLOGICAL EFFECTS OF THESE PRODUCTS ON THE NERVOUS SYSTEM OF PRIMATES MUST BE STUDIED. USING BEHAVIOR AS AN INDEX, THE FUNCTIONAL INTEGRITY OF THE NERVOUS SYSTEM CAN BE MEASURED. THIS DATA WILL PROVIDE A DATA BASE IN SUPPORT OF THE AGENCY'S REGULATORY POLICY. THE PROPOSED CONTRACT WILL UTILIZE AUTOMATED BEHAVIORAL TESTING METHODS DEVELOPED IN THIS PROJECT (EPA PROJECT #625F-B03) UNDER CONTRACT WITH IOWA STATE UNIVERSITY TO TEST BEHAVIORAL TOXICITY OF CANDIDATE POLLUT

****PROJECT: 02707-AIR POLLUTION AND CARDIOPULMONARY FUNCTIONS**

STARTING/ COMPLETION DATE : 10/76 - 10/78 : FUNDING : ESTIMATED - FY77 / \$ 154000
 TASK CODE=H625F-7166 **EPA-R804256 ** (GRANT) PRIOR FY76 / \$ 162000

EPA OFFICER.: WB RIGGAN EPA/HERL - RTP
 INVESTIGATOR.: RA MOSTARDI UNIVERSITY OF AKRON
 BL RICHARDSON UNIVERSITY OF AKRON
 GA ATWOOD UNIVERSITY OF AKRON

MILESTONES....: 11/76 -GRANT AWARD
 11/78 -PROGRESS REPORT
 11/79 -FINAL REPORT

PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES.: RECN-002707 SSIE-GMA 3582 EPA -R804256 TASK-H625F-7166
 AP -625F DU -N140 LABT-HEE

ABSTRACT..... THE BASIC STRUCTURE OF THIS EXPERIMENTAL DESIGN IS TO EXAMINE THE EFFECTS OF AIR POLLUTION ON VARIOUS CARDIOPULMONARY PARAMETERS. THE DESIGN WILL INVOLVE BOTH LONGITUDINAL AND CROSS-SECTIONAL APPLICATIONS AND INCLUDE A NUMBER OF AGE GROUPS. THREE GEOGRAPHIC LOCATIONS WILL BE SELECTED AND INCLUDE: 1) AN AREA OF HEAVY POPULATION. 2) AN AREA OF INTERMEDIATE OR VARYING POPULATION. 3) A CLEAN AREA. IN EACH OF THE AREAS A MINIMUM OF 150 VOLUNTEERS WITHIN EACH AGE GROUP WILL BE TESTED. THE VARIOUS TESTS WHICH WILL BE CONDUCTED AND OTHER DATA COLLECTED INCLUDE: 1) VITAL DATA, 2) PULMONARY FUNCTION TESTING, 3) MAXIMAL EXPIRATORY FLOW VOLUME CURVES, 4) MULTIPLE-LOAD EXERCISE TEST, 5) ALPHA-1-ANTITRYPSIN, 6) METHEMOGLOBIN, 7) CARBOXYHEMOGLOBIN, 8) MERCURY AND CADMIUM IN BLOOD, 9) MERCURY AND ARSENIC IN URINE, 10) TRACE METALS IN HAIR, 11) QUESTIONNAIRE COMPLETION. AEROMETRIC MONITORING WILL BE CARRIED OUT AT MULTIPLE SITES WITHIN EACH OF THE THREE AREAS AND WILL INCLUDE: 1) TOTAL SUSPENDED PARTICULATE, 2) SO2, 3) NOX, 4) HYDROCARBONS, 5) OZONE, 6) TRACE METALS, 7) METEOROLOGICAL DATA. THE DATA COLLECTED WILL BE ANALYZED AMONG AND BETWEEN THE AGE GROUPS USING MULTIPLE LINEAR REGRESSION AND ANALYSIS OF VARIANCE MODELS.

****PROJECT: 02709-PREPARATION AND CHARACTERIZATION OF FINELY PARTICULATE ENVIRONMENTAL CONTAMINANTS FOR BIOLOGICAL EXPERIMENTATION**

STARTING/ COMPLETION DATE : 08/76 - 03/78 : FUNDING : ESTIMATED - FY77 / \$ 24900
 TASK CODE=H625F-7171 **EPA-68-02-2451 ** (CNTR.) PRIOR FY76 / \$ 79300

EPA OFFICER.: M KIRTZ EPA/HERL - RTP
 INVESTIGATOR.: G YAMATE I I T RES INST
 D WALIA I I T RES INST
 J GRAF I I T RES INST
 E STEINAR I I T RES INST

MILESTONES....: 07/77 -SHIP SAMPLES TO RTP
 09/77 -COMPLETE SAMPLE ANALYSIS
 12/77 -COMPLETE COMMINGTONITE ANALYSIS

PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES.: RECN-002709 SSIE-GMA 3364 I EPA -68-02-2451 TASK-H625F-7171
 AP -625F DU -N140 LABT-HEE

ABSTRACT..... THE OBJECTIVE OF THIS PROGRAM IS TO PREPARE A VARIETY OF PARTICULATE SUBSTANCES WHOSE SIZE DISTRIBUTION, PURITY, ETC. ARE RELIABLY AND CAREFULLY CHARACTERIZED FOR USE IN A VARIETY OF BIOLOGICAL EXPERIMENTS BY EPA PERSONNEL AND CONTRACTORS. METALLIC COMPOUNDS, BENZO (A) PYRENE, UICC AMOSITE FIBERS, AND OTHER COMPOUNDS WILL BE OBTAINED, CHARACTERIZED, AND SUPPLIED, EITHER ALONE OR COMBINED, IN THE SIZE RANGE OF INTEREST TO EPA OR ITS CONTRACTORS. IN ADDITION, AMPHIBOLE FIBERS WILL BE FROM THE PETER MITCHELL PIT OF THE RESERVE MINING COMPANY IN MINNESOTA AND WILL BE COMPARED TO THOSE FIBERS FOUND IN AMBIENT AIR SAMPLES FROM SILVER BAY AND BABBITT, MINNESOTA. APPROPRIATE FIBERS FROM THE PIT WILL BE CHARACTERIZED AND SUPPLIED, EITHER ALONE OR IN COMBINATION WITH OTHER COMPOUNDS, TO EPA OR ITS CONTRACTORS.

****PROJECT: 02710-BIOLOGICAL ASSESSMENT OF EXPOSURE TO SULFUR DIOXIDE AND ACID SULFATE**

STARTING/ COMPLETION DATE : 06/77 - 12/80 : FUNDING : ESTIMATED - FY77 / \$ 105000
 TASK CODE=H625F-7187 **EPA-R805622-01 ** (GRANT) PRIOR FY /

EPA OFFICER.: CG HAYES
 INVESTIGATOR.: KV RAJAGOPALAN
 MILESTONES....: 11/77 -AWARD GRANT
 11/78 -PROGRESS REPORT
 11/79 -PROGRESS REPORT - GRANT CONTINUATION APPLICATION
 11/80 -FINAL REPORT

PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: RECN-002710 SSIE-GMA 432B EPA -R805622-01 TASK-H625F-7187
 AP -625F DU -N140 LABT-HEE

ABSTRACT.....: THE USE OF HIGH-SULFUR COAL AS A SOURCE OF ENERGY IS EXPECTED TO GENERATE HIGHER ATMOSPHERIC CONCENTRATIONS OF SULFUR DIOXIDE AND ACID SULFATE. IT IS GENERALLY BELIEVED THAT THESE COMPOUNDS COULD AFFECT THE HEALTH OF HUMAN POPULATIONS WHICH MAY BE EXPOSED TO THEM. BECAUSE OF THIS, IT IS OF ADVANTAGE TO HAVE AVAILABLE RELIABLE BIOLOGICAL INDICES FOR DETECTION OF EXPOSURE TO THESE CHEMICALS. THE RELEVANT TESTS SHOULD BE APPLICABLE TO BLOOD SAMPLES OBTAINED FROM SAMPLES OF HUMAN POPULATION. IN THE CASE OF SULFUR DIOXIDE, IT IS CONCEIVABLE THAT METABOLITES SUCH AS SULFITE, THIO-SULFATE AND S-SULFOCYSTEINE MAY BE PRESENT IN THE BLOOD OF EXPOSED INDIVIDUALS IN CONCENTRATIONS HIGHER THAN THOSE IN NORMAL POPULATIONS. USING THE RAT AS THE EXPERIMENTAL ANIMAL, THIS PROJECT WILL EXPLORE THE POSSIBILITY OF DEVELOPING SENSITIVE TESTS FOR THE PRESENCE OF THESE COMPOUNDS IN BLOOD OF ANIMALS EXPOSED TO VARIOUS LEVELS OF SO₂. PROCEDURES FOR ASSESSING EXPOSURE TO ACID SULFATE MAY ALSO BE POSSIBLE TO DEVELOP. SINCE SULFITE OXIDASE IS AN ENZYME CAPABLE OF DETOXIFYING SO₂, METHODS FOR EPIDEMIOLOGICAL TESTING OF SULFITE OXIDASE IN HUMAN POPULATIONS WILL ALSO BE INVESTIGATED.

****PROJECT: 02712-ENVIRONMENTAL MUTAGENS STUDIES UTILIZING A DROSOPHILA TEST SYSTEM**

STARTING/ COMPLETION DATE : 09/77 - 09/80 : FUNDING : ESTIMATED - FY77 / \$ 64000
 TASK CODE=H625F-7189 **EPA-R802030 ** (GRANT) PRIOR FY /

EPA OFFICER.: CG HAYES
 INVESTIGATOR.: JW BAUM
 MILESTONES....: 09/77 -INITIATE SERIES OF STUDIES
 09/78 -PROGRESS REPORT
 09/79 -PROGRESS REPORT
 09/80 -FINAL REPORT

PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: RECN-002712 SSIE-GMA 4319 EPA -R802030 TASK-H625F-7189
 AP -625F DU -N140 LABT-HEE

ABSTRACT.....: THE OBJECTIVE OF THIS INTERAGENCY AGREEMENT IS TO CONDUCT ENVIRONMENTAL MUTAGEN STUDIES OF AIR POLLUTANTS USING A DROSOPHILA TEST SYSTEM. THESE STUDIES WILL BE COORDINATED WITH AN ONGOING EFFORT TO DETERMINE THE PRESENCE OF MUTAGENIC AGENTS IN AMBIENT AIR IN WHICH THE NATIONAL INSTITUTE FOR ENVIRONMENTAL HEALTH SCIENCES, DHEW, BROOKHAVEN NATIONAL LABORATORIES, ERDA, AND THE HEALTH EFFECTS RESEARCH LABORATORY, EPA ARE COLLABORATING. THROUGH AN INTERAGENCY AGREEMENT WITH NIEHS, BROOKHAVEN NATIONAL LABORATORIES HAS DEVELOPED A MOBILE EXPOSURE FACILITY TO CONDUCT MUTAGENICITY TESTS USING THE TRADESCANTIA TEST SYSTEM UNDER ACTUAL, AS OPPOSED TO SIMULATED, AIR POLLUTION EXPOSURES. THE ENVIRONMENTAL PROTECTION AGENCY IS PROVIDING MOBILE AEROMETRIC SUPPORT CONCURRENTLY WITH THE STUDIES. IN ADDITION, EPA IS COLLECTING BOTH VAPOR PHASE AND PARTICULATE SAMPLES FOR CHEMICAL CHARACTERIZATION AND FOR ADDITIONAL MUTAGENICITY TESTS IN THE LABORATORY. THE DROSOPHILA STUDIES WILL COMPLEMENT THE BATTERY OF TESTS CURRENTLY IN USE.

****PROJECT: 02713-IN VITRO SCREENING OF SELECTED AIR POLLUTANTS FOR POTENTIAL CARCINOGENICITY**

STARTING/ COMPLETION DATE : 11/75 - 11/77 : FUNDING : ESTIMATED - FY77 / \$ 46500
 TASK CODE=H625F-7190 **EPA-68-02-2271 ** (CNTR.) PRIOR FY /

EPA OFFICER.: MD WATERS
 INVESTIGATOR.: LM SCHECHTMAN
 RE KOURI
 MILESTONES....: 03/77 -PRELIMINARY REPORT ON METABOLIC ACTIVATION IN V-79 AND BALB/3T3 S
 08/77 -FINAL REPORT ON METABOLIC ACTIVATION IN V-79, BALB/3T3 AND 10T1/2
 10/77 -COMPLETION OF TESTING OF 10 SUBSTANCES WITH AND WITHOUT METABOLIC

PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: RECN-002713 SSIE-GMA 2710 1 EPA -68-02-2271 TASK-H625F-7190
 AP -625F DU -N140 LABT-HEE

ABSTRACT.....: THE PURPOSE OF THIS CONTRACT IS TO PROVIDE THE CAPABILITY FOR IN VITRO SCREENING OF SELECTED ENVIRONMENTAL POLLUTANTS FOR POTENTIAL CARCINOGENICITY. THE CONTRACTOR SHALL EMPLOY THE ESTABLISHED BALB/C 3T3 AND 10T1/2 BIOASSAY SYSTEMS FOR DETERMINING MORPHOLOGIC CELLULAR TRANSFORMATION. METABOLIC ACTIVATION SYSTEMS SHALL BE IMPLEMENTED FOR EMPLOYMENT WITH THE BALB/C 3T3 CELLS INITIALLY AND EVENTUALLY ALSO WITH THE 10T1/2 CELLS. THESE ACTIVATION SYSTEMS SHALL BE ESTABLISHED BY USE OF AND CORRELATED WITH MUTAGENESIS OF MICROBIAL (SALMONELLA TYPHIMURIUM) AND MAMMALIAN (V79) CELL SYSTEMS. THE CONTRACTOR HAS IMPLEMENTED A NEW MOUSE FIBROBLAST STRAIN -BALB/3T3 CLONE A31-1 FOR CELLULAR NEOPLASTIC TRANSFORMATION STUDIES WITH POTENTIALLY CARCINOGENIC ENVIRONMENTAL CHEMICALS. THIS SYSTEM WILL BE USED IN CONJUNCTION WITH THE C3H10T1/2 NEOPLASTIC TRANSFORMATION SYSTEM ON THOSE SAMPLES WHICH TEST POSITIVE IN THE AMES SALMONELLA TYPHIMURIUM MICROBIAL AND CHINESE HAMSTER LUNG (V79) MAMMALIAN CELL MUTAGENESIS TEST SYSTEMS. METABOLIC ACTIVATION METHODS ARE BEING DEVELOPED TO PERMIT USE OF THESE NEOPLASTIC TRANSFORMATION SYSTEMS WITH ENVIRONMENTAL CHEMICALS WHICH MUST BE METABOLIZED TO BRING ABOUT NEOPLASTIC TRANSFORMATION. SAMPLES WHICH HAVE BEEN COLLECTED FROM FLUIDIZED BED CONVERSION PROCESS PLANT WILL BE SCREENED DURING THE NEXT QUARTER.

****PROJECT: 04173-METABOLISM OF INHALED TRACE METAL EFFLUENTS FROM COMBUSTION PROCESSES**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 111000
 TASK CODE=V625F-19 **EPA=D7-E681 ** (IAG) PRIOR FY76 / \$ 249000
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: RG CUDDIHY LOVELACE FOUND FOR MED ED & RES
 SH WEISSMAN LOVELACE FOUND FOR MED ED & RES
 RC PFLEGER LOVELACE FOUND FOR MED ED & RES
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-004173 SSIE-GMA 4667 EPA -D7-E681 TASK-V625F-19
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... A VARIETY OF TRACE METALS ARE FOUND IN ATMOSPHERIC AEROSOLS WHICH ARE FORMED FROM NATURAL AND ANTHROPOGENIC PROCESSES. FURTHER STUDY OF THE BIOLOGICAL IMPORTANCE OF TRACE METALS IS NEEDED BECAUSE THEY MAY BE TOXIC IN THEMSELVES OR IN COMBINATION WITH OTHER ATMOSPHERIC COMPONENTS AND THEY MAY ALSO BE USEFUL AS EASILY MEASURED TRACERS TO DETERMINE MAN'S OVERALL ENVIRONMENTAL EXPOSURE. THIS STUDY CONCENTRATES ON TRACE METAL CHARACTERISTICS OF EFFLUENTS FROM ENERGY PRODUCTION, ESPECIALLY THOSE RELATED TO THE COMBUSTION OF FOSSIL FUELS. SELECTED METALS WHICH MERIT FURTHER STUDY IN THIS PROJECT INCLUDE CADMIUM, VANADIUM, ARSENIC AND SELENIUM. THESE ARE BEING INCORPORATED INTO CONDENSATION AEROSOLS OF THE METAL OXIDES AND INTO AEROSOLS CONTAINING OXY-SULFATE FORMS. THE OXY-SULFATE AEROSOLS ARE CHARACTERISTIC OF AEROSOLS OBTAINED WHEN METAL OXIDES INTERACT WITH SULFUR OXIDES OR SULFURIC ACID IN THE ATMOSPHERE. BEAGLE DOGS, SYRIAN HAMSTERS AND FISCHER RATS ARE BEING EXPOSED TO THE AEROSOLS BY INHALATION. DEPOSITION, RETENTION AND METABOLISM OF THE INHALED METALS ARE BEING STUDIED IN THE ANIMALS OVER SEVERAL HUNDREDS OF DAYS AFTER EXPOSURE. THEIR EFFECTS ON LUNG CELL MACROPHAGES AND TYPE II ALVEOLAR CELLS ARE ALSO BEING ASSESSED. THIS INCLUDES IN VITRO AND IN VIVO STUDIES OF CELL VIABILITY AND FUNCTION. THESE DATA WILL BE USED TO PROVIDE POPULATION DOSIMETRY MODELS USEFUL FOR INTERPRETING THE ENVIRONMENTAL AND HUMAN HEALTH

****PROJECT: 04174-DEPOSITION, RETENTION AND DOSIMETRY OF INHALED REACTION PRODUCTS WHICH MAY RESULT FROM SO2-PARTICULATE REACTIONS**

STARTING/ COMPLETION DATE : 04/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 115000
 TASK CODE=V625F-20 **EPA=D7-E681 ** (IAG) PRIOR FY76 / \$ 258000
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: MB SNIPES LOVELACE FOUND FOR MED ED & RES
 TL KIRCHGESSNER LOVELACE FOUND FOR MED ED & RES
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-004174 SSIE-GMA 4664 EPA -D7-E681 TASK-V625F-20
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... SULFUR COMPOUNDS, ESPECIALLY OXIDES AND SULFATES, ARE IMPORTANT RELEASE OR REACTION PRODUCTS ASSOCIATED WITH THE CONVERSION OF FOSSIL FUELS TO ENERGY. CONDENSATION OF THESE COMPOUNDS AND/OR REACTION PRODUCTS RESULTS IN RESPIRABLE PARTICLES WHICH HAVE BEEN SHOWN TO PRODUCE MARKED ALTERATIONS IN RESPIRATORY PARAMETERS OF EXPERIMENTAL ANIMALS AND THESE CHANGES PRESUMABLY OCCUR IN HUMANS. CHANGE IN PULMONARY FUNCTION COULD INCLUDE ALTERATION OF CLEARANCE RATES FOR PARTICULATE MATTER AND CHANGES IN THE THICKNESS AND VISCOSITY OF MUCOUS LINING MAJOR AIRWAYS. IT IS IMPORTANT TO DEFINE DISTRIBUTION PATTERNS IN LUNG FOR THESE INHALED IRRITANTS AND DETERMINE THEIR MECHANISMS OF PHYSIOLOGICAL CHANGE TO BETTER UNDERSTAND THE MAGNITUDE OF RISK FOR HUMANS EXPOSED TO THESE MATERIALS. THIS RESEARCH PROJECT IS DESIGNED TO PROVIDE INFORMATION NECESSARY FOR RELATING DOSE TO EFFECT AFTER INHALATION OF THESE TOXICANTS BY ANIMALS, INCLUDING THE FISCHER-344 RAT AND BEAGLE DOG. SPECIFIC STUDIES HAVE BEEN DEVELOPED TO EXAMINE THE 3-DIMENSIONAL DISTRIBUTION OF INHALED TOXICANT AS A FUNCTION OF TIME AFTER EXPOSURE AND CHANGES IN DEPOSITION AND RETENTION OF TEST AEROSOLS DEPOSITED IN LUNG BEFORE, DURING OR AFTER INHALATION OF THE NON-NUCLEAR TOXICANTS. PROGRESS TO DATE RELATES PRIMARILY TO DEVELOPMENT OF EXPOSURE EQUIPMENT AND TEST AEROSOLS. TWO STUDIES WILL BE INITIATED IN THE NEAR FUTURE USING FISCHER-344 RATS TO (1) EXAMINE TOXICANT DISTRIBUTION IN THE LUNG AFTER INHALATION OF SULFURIC ACID MIST AND (2) DISTRIBUTION AND RETENTION OF INHALED MONODISPERSE INERT PARTICLES AFTER INHALATION

****PROJECT: 04175-CYTOGENETIC STUDIES OF LUNG CELLS FOLLOWING INHALATION OF FLY ASH, CHEMICAL MUTAGENS AND EFFLUENTS FROM POWER-RELATED INDUSTRY**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 126000
 TASK CODE=V625F-21 **EPA=D7-E681 ** (IAG) PRIOR FY76 / \$ 284000
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: AL BROOKS LOVELACE FOUND FOR MED ED & RES
 RL CARPENTER LOVELACE FOUND FOR MED ED & RES
 CN MITCHELL LOVELACE FOUND FOR MED ED & RES
 DE BICE LOVELACE FOUND FOR MED ED & RES
 NA HACKETT LOVELACE FOUND FOR MED ED & RES
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-004175 SSIE-GMA 4668 EPA -D7-E681 TASK-V625F-21
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... EXPERIMENTS ARE BEING DIRECTED TOWARD UNDERSTANDING CHANGES AT THE CELLULAR LEVEL FOLLOWING INHALATION OF PARTICULATE MATTER (FLY ASH) AND POLYCYCLIC HYDROCARBONS RELEASED FROM COAL-POWERED ELECTRICAL PLANTS. AN EFFORT IS UNDER WAY TO CHARACTERIZE THE DEPOSITION AND RETENTION OF NEUTRON-ACTIVATED FLY ASH WHICH WILL BE USEFUL IN CALCULATING DOSE OF FLY ASH TO LUNGS FOLLOWING PROTRACTED EXPOSURES. ABOUT 10% OF THE INHALED FLY ASH IS RETAINED IN THE SYRIAN HAMSTER WITH AN 83-DAY HALF-LIFE. STUDIES ON THE INDUCTION OF AHH FOLLOWING INHALATION ARE IN PROGRESS. EARLY RESULTS INDICATE THAT THE ENZYME LEVEL IN THE LIVER OF THE CHINESE HAMSTER CAN BE INDUCED WITH BENZ(A)PYRENE. THE MAJOR EFFORT IS DIRECTED TOWARD DEVELOPMENT OF METHODS FOR EVALUATING CYTOGENETIC CHANGES IN LUNG CELL POPULATIONS FOLLOWING INHALATION OF POWER PLANT EFFLUENTS. CELL POPULATIONS BEING STUDIED ARE MACROPHAGES, TRACHEAL EPITHELIUM AND TYPE II EPITHELIAL CELLS. ADDITIONAL EFFORT IS BEING DIRECTED TOWARD OBTAINING A BETTER UNDERSTANDING OF PULMONARY CELL KINETICS. THESE STUDIES SHOW THAT FOR THE CHINESE HAMSTER THE LUNG CELLS DO NOT PROLIFERATE VERY RAPIDLY AFTER THE ANIMAL REACHES 6 DAYS OF AGE. LONG-TERM RETENTION OF LABEL IN LUNG CELLS WILL BE USEFUL IN DETERMINING THE NORMAL SLOW TURNOVER RATE IN ADULT ANIMALS. THE CYTOGENETIC CHANGES AND ENZYME ACTIVATION DATA WILL SERVE AS AN INDEX OF BIOLOGICAL AND MUTAGENIC ACTIVITY WHICH, COUPLED WITH RETENTION, DISTRIBUTION AND CELL TURNOVER DATA, MAY BE USEFUL IN EVALUATING HAZARDS AND PREDICTING LONG-TERM EFFECTS OF THESE MATERIALS IN HUMANS

****PROJECT: 04178-THE USE OF MALE GERMINAL TISSUE IN THE DETECTION OF MUTATIONAL EVENTS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 16000
 TASK CODE=V625F-22 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: HV MALLING US HEW NATL INST OF HLTH /PHS
 MILESTONES.... 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-N-004176 SSIE-GMA 4776 EPA -D5-E772 TASK-V625F-22
 AP -625F DU -N140 LABT-EMI
 ABSTRACT..... THE AIM OF THIS PROJECT IS TO DEVELOP SYSTEMS FOR MEASURING THE FREQUENCY OF POINT MUTATIONS AND DNA CHANGE IN MALE GERMINAL TISSUE. THESE SYSTEMS WOULD HAVE THE ADVANTAGE OF TESTING THE HUMAN POPULATION BY MEANS OF READILY AVAILABLE SAMPLES, I.E., SPERMATOZOA. AT PRESENT ENZYME HISTOCHEMICAL METHODS ARE BEING DEVELOPED TO DETECT POINT MUTATIONS IN MALE MICE AND THREE ENZYMES AND THEIR INHIBITORS HAVE BEEN CHARACTERIZED. THESE ENZYMES ARE ALPHA-GLYCEROPHOSPHATE DEHYDROGENASE, LACTATE DEHYDROGENASE AND SUCCINATE DEHYDROGENASE. PRELIMINARY WORK HAS STARTED WITH THE AXIOMATE SCANNING MICROSCOPE TO DETERMINE ITS USEFULNESS IN MEASURING THE DISTRIBUTION OF DNA CONTENT IN A POPULATION OF SPERM. IT IS HOPED THAT THIS INSTRUMENT MAY PROVE USEFUL IN SHOWING CHANGES IN THE DISTRIBUTION PATTERN IN SPERM POPULATIONS DERIVED FROM MICE TREATED OR UNTREATED WITH KNOWN MUTAGENS.

****PROJECT: 04177-DEVELOPMENTAL TOXICITY INDICATORS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 70000
 TASK CODE=V625F-23 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: RL DIXON US HEW NATL INST OF HLTH /PHS
 MILESTONES.... 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-N-004177 SSIE-GMA 4742 EPA -D5-E772 TASK-V625F-23
 AP -625F DU -N140 LABT-EMI
 ABSTRACT..... OBJECTIVE: TO ASSESS THE POSTNATAL TOXIC EFFECTS OF GESTATIONAL CHEMICAL EXPOSURE. METHODS EMPLOYED: THE FISCHER RAT WILL BE THE TEST ANIMAL FOR ROUTINE STUDIES. OTHER SPECIES SUCH AS MICE, HAMSTERS, GUINEA PIGS, OR RABBITS MIGHT BE USED ALSO IN FUTURE ATTEMPTS TO DEFINE SPECIES VARIABILITY. FEMALE RATS WILL BE EXPOSED TO THE TEST CHEMICAL FOR A DEFINED PERIOD EITHER PRIOR TO BREEDING OR FOLLOWING CONCEPTION. CHEMICAL EXPOSURE WILL CONTINUE DURING GESTATION AND WILL BE DISCONTINUED ONE DAY PRIOR TO EXPECTED PARTURITION. OFFSPRING WILL BE EXAMINED FOR SIGNS OF TOXICITY AT FIVE DEFINED POSTNATAL PERIODS. AT EACH TEST PERIOD, VARIOUS GROSS, CHEMICAL, HEMATOLOGICAL, AND FUNCTIONAL TESTS WILL BE PERFORMED. SPECIAL EMPHASIS SHOULD BE DIRECTED TO THE FOLLOWING SYSTEMS (OR FUNCTIONS): BONE MARROW AND BLOOD; MOTOR AND SENSORY FUNCTION OF THE NERVOUS SYSTEM (INCLUDING PAIN, TASTE, OLFACTION, AUDITION, AND VISION); BEHAVIOR AND "MEMORY"; CARDIOVASCULAR RESPONSES; RESPIRATION; RENAL FUNCTION AND BODY FLUID BALANCE; DIGESTIVE SYSTEM; METABOLISM (ENERGY EXCHANGE); ENDOCRINOLOGY; REPRODUCTION; IMMUNOLOGIC CAPACITY; AND PATHOLOGY. TESTS OF OVERALL HEMEOSTASIS, PHYSICAL ENDURANCE, AND ADAPTATION TO STRESS ARE ALSO DESIRED.

****PROJECT: 04179-CARCINOGENESIS OF FOSSIL FUEL-RELATED COMBUSTION PRODUCTS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=V625F-24 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: P NETTESHEIM US HEW NATL INST OF HLTH /PHS
 MILESTONES.... 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-N-004179 SSIE-GMA 4738 EPA -D5-E772 TASK-V625F-24
 AP -625F DU -N140 LABT-EMI
 ABSTRACT..... THE BYPRODUCTS OF FOSSIL FUEL COMBUSTION ARE A COMPLEX MIXTURE OF COMPOUNDS WHICH INCLUDE POLYCYCLIC AROMATIC HYDROCARBONS (PAH'S). MANY OF THESE PAH'S (FOR EXAMPLE BENZO(A)PYRENE) ARE KNOWN TO BE POTENT CARCINOGENS. WHEN COMPLEX MIXTURES OF PAH'S ARE ASSAYED FOR CARCINOGENIC ACTIVITY, THEY ARE HIGHLY ACTIVE. IN FACT, THE ACTIVITY OF THE MIXTURE OFTEN GREATLY EXCEEDS THE ACTIVITY OF EACH OF THE ISOLATED COMPONENTS. THIS SUGGESTS THAT CERTAIN NON-CARCINOGENIC OR WEAKLY CARCINOGENIC COMPOUNDS IN THE MIXTURE ACT TO ENHANCE OR TO PROMOTE THE ACTIVITY OF THE CARCINOGENIC AGENTS. IN AN EFFORT TO ASSESS THE HAZARD OF FOSSIL FUEL COMBUSTION PRODUCTS, ONE MUST THEREFORE CONSIDER NOT ONLY THE CARCINOGENIC FACTORS IN THE BYPRODUCTS, BUT ALSO THEIR INTERACTION WITH OTHER BYPRODUCTS. A THEORETICAL BASIS FOR THIS INTERACTION IS LACKING AND A BETTER UNDERSTANDING OF THE BASIC MECHANISMS OF CARCINOGENESIS IS REQUIRED. OUR STUDIES ON THIS PROBLEM ARE CENTERED ON TWO LEVELS. THE FIRST LEVEL IS THE INITIATION OF CARCINOGENESIS, WHILE THE SECOND LEVEL IS HOW THE INITIATED CELL DEVELOPS INTO A MALIGNANT CANCER AND WHAT FACTORS MODULATE THIS DEVELOPMENT. AN UNDERSTANDING OF THIS ENTIRE PROCESS WILL ALLOW A BETTER ASSESSMENT OF HOW TO ELIMINATE FACTORS WHICH INDUCE CANCER. OUR APPROACH TO THESE PROBLEMS HAS BEEN TO STUDY THE EFFECT OF CARCINOGENS AND PROMOTERS OF CARCINOGENESIS ON CELLS GROWN IN CULTURE. BY STUDYING THE INTERACTION OF CHEMICALS AND CELLS IN CULTURE RATHER THAN IN ANIMALS, WE TEMPORARILY IGNORE THE IN VIVO FACTORS INFLUENCING CARCINOGENESIS AND FOCUS ON THE PROBLEM AS A CELLULAR EVENT. THIS ENABLES US TO UNDERSTAND THE MOLECULAR AND CELLULAR MECHANISMS INVOLVED. SPECIFICALLY, WE ARE INTERESTED IN (1) HOW CHEMICALS SUCH AS BENZO(A)PYRENE INITIATE CARCINOGENESIS AND WHETHER THIS INITIATION IS ANALOGOUS TO OTHER BIOLOGICAL RESPONSES SUCH AS MUTATION; (2) HOW INITIATED CELLS DEVELOP AS MALIGNANT CELLS AND (3) HOW NORMAL CELL

****PROJECT: 04180-MUTAGENESIS IN CULTURED LYMPHOCYTES**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 218002
 TASK CODE=V625F-25 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: AD BLOOM COLUMBIA UNIV
 HS ROSENKRANZ COLUMBIA UNIV COL OF PHYS & SURGEONS/PEDIATRICS
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-004180 SSIE-GMA 4746 EPA -D5-E772 COL OF PHYS & SURGEONS/PEDIATRICS
 AP -625F DU -N140 LABT-EMI TASK-V625F-25
 ABSTRACT..... THIS PROJECT INVOLVES THE DEVELOPMENT OF MAMMALIAN LYMPHOID CULTURE SYSTEMS TO TEST FOR THE
 MUTAGENICITY OF ENVIRONMENTAL AGENTS. COMPOUNDS WHICH ARE KNOWN MUTAGENS (SUCH AS ALKYLATING
 AGENTS, AND FRAMESHIFT MUTAGENS) WILL BE TESTED IN HUMAN AND LYMPHOID CELL LINES FOR THE INDUCTION
 OF MUTATIONS AT THE HYPOXANTHINE-GUANINE PHOSPHORIBOSYL TRANSFERASE AND THE ARGININOSUCCINIC ACID
 SYNTHETASE LOCI, AND IN MURINE LYMPHOID CELLS FOR THE INDUCTION OF ALTERED IMMUNOGLOBULIN. THE
 INDUCTION OF CHROMOSOMAL BREAKAGE IN THESE CELL LINES WILL BE STUDIED USING THE G AND H BANDING
 TECHNIQUES. IN ADDITION, THE RESEARCH WILL UTILIZE BACTERIAL TEST SYSTEMS TO DETERMINE THE
 RELATIONSHIP BETWEEN MUTAGENICITY IN SIMPLER ORGANISMS AND IN MORE COMPLEX, DIFFERENTIATED

****PROJECT: 04181-MULTIPLE LOCI SCREEN FOR MUTATIONS IN MAMMALIAN CELLS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 97322
 TASK CODE=V625F-26 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: MJ SICILIANO UNIVERSITY OF TEXAS
 RM HUMPHREY UNIVERSITY OF TEXAS
 TC HSU UNIVERSITY OF TEXAS
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-004181 SSIE-GMA 4757 EPA -D5-E772 TASK-V625F-26
 AP -625F DU -N140 LABT-EMI
 ABSTRACT..... IT IS OUR INTENTION TO DEVELOP A NEW SYSTEM FOR TESTING THE MUTAGENIC POTENTIAL OF VARIOUS
 ENVIRONMENTAL AGENTS ON MAMMALIAN SOMATIC CELLS. THE BASIS OF THE PROCEDURE IS TO EXPOSE CELLS TO
 MUTAGEN AND PLATE OUT SINGLE CELL CLONES. CLONAL ISOLATES, AFTER BEING GROWN UP TO 40 X 10 TO THE
 6TH POWER CELLS, ARE THEN SCREENED FOR ELECTROPHORETIC VARIATION OF THE PRODUCTS OF OVER 40 GENETIC
 LOCI. WHERE A CLONAL VARIANT IS DETECTED, IT IS ISOLATED AND ITS HERITABILITY DETERMINED BY
 SUBCLONING AND SUBSEQUENT ELECTROPHORESIS. THE PROCEDURE AVOIDS MANY OF THE PROBLEMS ASSOCIATED
 WITH THE DETECTION ON SELECTIVE SYSTEMS OF RECESSIVE MUTATIONS (AUXOTROPHIC, DRUG RESISTANT, AND
 TEMPERATURE SENSITIVE) IN DIPLOID MAMMALIAN CELLS SINCE ELECTROPHORETIC MUTATIONS ARE CO-DOMINANT.
 LACK OF ENRICHMENT FOR MUTANTS BY SELECTION IS ALSO COMPENSATED FOR BY THE INCREASED PROBABILITY OF
 OBTAINING AN ELECTROPHORETIC SHIFT IN A PROTEIN AS THE RESULT OF A SINGLE NUCLEOTIDE SUBSTITUTION
 IN ITS GENE AS OPPOSED TO THE COMPLETE LOSS OF FUNCTION BY SUCH AN EVENT AND, THE STUDY OF THE
 PRODUCTS OF A LARGE NUMBER OF LOCI. ADDITIONAL ATTRIBUTES OF THE PROCEDURE ARE THAT: EACH VARIANT
 MAY BE ASSOCIATED WITH A SPECIFIC GENETIC LOCUS, MUTATIONS IN A WIDE RANGE OF GENETIC LOCI MAY BE
 STUDIED, THE SYSTEM REQUIRES NO CHANGE IN THE MEDIUM LIMITING THE CAUSE OF ANY OBSERVED VARIATION
 TO INTRACELLULAR EVENTS, AND MUTATIONS IN BOTH STRUCTURAL GENES AS WELL AS THOSE AFFECTING GENE
 EXPRESSION CAN BE SPECIFICALLY DETECTED. OUR PRELIMINARY STUDIES USING CHINESE HAMSTER OVARY CELLS
 (CHO) HAVE REVEALED THAT WE CAN ELECTROPHORETICALLY CHARACTERIZE THE PRODUCTS OF 51 STRUCTURAL
 ENZYME LOCI AND DETECT VARIANTS AT BOTH STRUCTURAL AND CONTROL LOCI. WE WISH TO CONTINUE THESE
 STUDIES IN ORDER TO OPTIMIZE VARIOUS PARAMETERS OF THE PROCEDURE -- DOSAGE OF MUTAGEN, TIME OF
 CLONING AND STAGE OF THE CELL CYCLE FOR MUTAGEN TREATMENT -- AND TO USE THE SYSTEM TO STUDY
 MUTATION FREQUE

****PROJECT: 04182-DEVELOPMENT OF DNA REPAIR FOR MONITORING HUMAN HEALTH**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 87632
 TASK CODE=V625F-27 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: AD MITCHELL S R I INTERNATIONAL
 K STEFOS S R I INTERNATIONAL
 MV MCMACKEN S R I INTERNATIONAL
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-004182 SSIE-GMA 4758 EPA -D5-E772 TASK-V625F-27
 AP -625F DU -N140 LABT-EMI
 ABSTRACT..... THE NATION'S RESPONSE TO THE NEEDS FOR ENERGY SELF-SUFFICIENCY COULD INCREASE THE NUMBER OF
 HAZARDOUS AGENTS THAT ARE RELEASED INTO MAN'S DAILY ENVIRONMENT. EFFICIENT AND ECONOMICAL SYSTEMS
 ARE NEEDED TO PREDICT HUMAN SUSCEPTIBILITY TO HAZARDOUS AGENTS AND TO MONITOR POPULATIONS FOR
 ADVERSE GENETIC EFFECTS WHICH MAY BE CAUSED BY UNFORSEEN MUTAGENS. THERE IS A HIGH PROBABILITY THAT
 THESE NEEDS COULD BE MET BY FURTHER DEVELOPMENT OF DNA REPAIR SYNTHESIS. THE UTILITY OF THE PRESENT
 IN VITRO DNA REPAIR SYNTHESIS TESTS CAN BE ENHANCED BY DEVELOPING IN VIVO DNA REPAIR SYNTHESIS TO
 MEASURE ORGAN AND TISSUE SPECIFICITIES OF RESPONSES TO HAZARDOUS AGENTS AND BY USING THESE SAME
 TISSUES AS THE SOURCES OF METABOLIC ACTIVATION ENZYMES FOR IN VITRO DNA REPAIR SYNTHESIS ASSAYS.
 THE SIGNIFICANCE OF DNA REPAIR SYNTHESIS WILL BE FURTHER ENHANCED BY EXAMINATIONS OF DNA REPAIR IN
 PREMATURELY CONDENSED CHROMOSOMES AND BY CORRELATIONS OF THE EXTENT OF DNA REPAIR WITH MEASUREMENTS
 OF CYTOGENETIC ABERRATIONS, WITH MUTAGENESIS OF MAMMALIAN CELLS, AND WITH CARCINOGENESIS AS
 MEASURED BY CELL TRANSFORMATION.

****PROJECT: 04183-HEPATIC AND EXTRAHEPATIC CONJUGATION AND OXIDATION METABOLIC PATHWAYS
FOR XENOBIOTICS IN MAMMALS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 20000
TASK CODE=V625F-28 **EPA=D5-E772 ** (IAG) PRIOR FY /

EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI NATL INST OF HLTH /PHS
INVESTIGATOR.: JR BEND US HEW
PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
ORDIS CODES... REC-004183 SSIE-GMA 4756 EPA -D5-E772 TASK-V625F-28
AP -625F DU -N140 LABT-EMI

ABSTRACT..... SEVERAL ARENE OXIDES AND ALKENE OXIDES ARE KNOWN TO REACT COVALENTLY WITH MACROMOLECULES, INCLUDING NUCLEIC ACIDS, AND TO TRANSFORM CELLS IN VITRO, SUGGESTING THEIR ROLE AS ULTIMATE CARCINOGENS. MUTAGENS, AND CYTOTOXINS. WE ARE STUDYING THE MIXED-FUNCTION OXIDASES, WHICH CONVERT UNSATURATED HYDROCARBONS TO EPOXIDES, AND THE FURTHER METABOLISM OF ARENE AND ALKENE OXIDES BY SOLUBLE FRACTION GLUTATHIONE S-TRANSFERASES AND MICROSOMAL EPOXI'E HYDRASE IN HEPATIC AND EXTRAHEPATIC TISSUES (INCLUDING TESTIS, OVARY, AND ADRENAL). THE RELATIVE QUANTITATIVE IMPORTANCE OF THE TWO PATHWAYS FOR EPOXIDE METABOLISM IS BEING STUDIED IN VITRO AND IN ISOLATED PERFUSED RAT LIVER AND RABBIT LUNG PREPARATIONS, WHICH HAVE INTACT CELLULAR STRUCTURE.

****PROJECT: 04184-ENVIRONMENTAL TERATOLOGY INFORMATION CENTER (ETIC)**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 100000
TASK CODE=V625F-29 **EPA=D5-E772 ** (IAG) PRIOR FY /

EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
INVESTIGATOR.: JS WASSOM U.S. DEPT. OF ENERGY
PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
ORDIS CODES... REC-004184 SSIE-GMA 4750 EPA -D5-E772 TASK-V625F-29
AP -625F DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVE: TO ESTABLISH A TERATOLOGY INFORMATION CENTER THAT WILL MEET AS MANY OF THE NEEDS OF THE BIOMEDICAL COMMUNITY AS IS FEASIBLE. METHODS EMPLOYED: 1. TO COLLECT REPRINTS OF ALL PUBLICATIONS THAT CONTAIN DATA PERTINENT TO DETERMINATION OF THE TERATOGENIC POTENTIAL OF ENVIRONMENTAL AGENTS OR CONDITIONS TO WHICH MAN IS EXPOSED; 2. TO PREPARE EXTRACTS FROM THE RELEVANT REFERENCES AND TO MAKE THE EXTRACTED INFORMATION AVAILABLE TO THE BIOMEDICAL COMMUNITY; AND 3. TO ENCOURAGE SCIENTIFIC EVALUATION OF THE ADEQUACY OF AVAILABLE DATA ON HIGH PRIORITY AGENTS FOR DETERMINATION OF TERATOGENIC POTENTIAL. PROGRESS DURING THIS PERIOD: THE NUMBER OF PERTINENT REFERENCES AND REPRINTS COLLECTED IN THE ETIC FILE WAS INCREASED BY 2,100 TO GIVE A CURRENT TOTAL ABOVE 10,000. ON JULY 25, 1977, 8,880 REFERENCES FROM THE TERATOLOGY FILE WERE MADE AVAILABLE TO USERS "ON-LINE" THROUGH THE ADDITION OF ETIC TO THE NATIONAL LIBRARY OF MEDICINE'S TOXLINE. THE "ON-LINE" ETIC FILE CONTAINS INFORMATION ON MORE THAN 2,200 AGENTS.

****PROJECT: 04185-REGULATION OF NEURAL DISTRIBUTION OF LEAD**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 67064
TASK CODE=V625F-30 **EPA=D5-E772 ** (IAG) PRIOR FY /

EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI SCH OF MED/PATH DEPT
INVESTIGATOR.: LA OTUAMA UNIV OF NORTH CAROLINA SCH OF MED/PATH DEPT
JT GATZY UNIV OF NORTH CAROLINA
PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
ORDIS CODES... REC-004185 SSIE-GMA 4751 EPA -D5-E772 TASK-V625F-30
AP -625F DU -N140 LABT-EMI

ABSTRACT..... FACTORS REGULATING THE ENTRY AND DISTRIBUTION OF INORGANIC LEAD IN THE NERVOUS SYSTEM WILL BE STUDIED UNDER CONTROL AND SELECTED ABNORMAL CONDITIONS. IN THE GUINEA PIG, IN VIVO CSF PERFUSION WILL QUANTITATE THE DISAPPEARANCE RATE OF 210PB AND 45CA ACROSS THE BLOOD-CSF BARRIER. THE UPTAKE OF 210PB AND 45CA ACROSS THE BLOOD-BRAIN BARRIER WILL BE MEASURED BY AN INDICATOR DILUTION TECHNIQUE. THESE MEASUREMENTS WILL BE CORRELATED WITH LEVELS OF LEAD AND CALCIUM IN THE ABSENCE OF AN INTACT BARRIER WILL BE ASSESSED BY MEASURING IN VITRO UPTAKE AND RELEASE OF 210PB AND CA. THIS WILL BE DETERMINED UNDER CONTROL CONDITIONS; AFTER INHIBITION OF GENERAL, OXIDATIVE AND GLYCOLYTIC METABOLISM; AFTER CHANGES IN MEDIUM ELECTROLYTE COMPOSITION AND AFTER EXPOSURE TO REAGENTS THAT ACT AS LIGANDS. AN EFFORT WILL BE MADE TO DISTINGUISH SOLUTE ACCUMULATION DUE TO BINDING WITHIN NEURAL TISSUE FROM THAT DUE TO MOVEMENT ACROSS THE TISSUE USING EXCISED BULLFROG CHOROID PLEXUS AND MENINGES WHICH CAN BE MOUNTED AS "POLAR" MEMBRANES, ALLOWING DIRECT MEASUREMENT OF TRANSEPITHELIAL FLUX. THIS PARAMETER WILL BE STUDIED IN CONTROL AND ACUTELY POISONED FROGS AND CONTRASTED WITH THE RESULTS OF IN VITRO UPTAKE AND RELEASE EXPERIMENTS IN THE SAME SPECIES. THE BEHAVIOR OF 109CD, A NON-NEUROTOXIC METAL, WILL ALSO BE OBSERVED IN SEVERAL OF THE ABOVE EXPERIMENTAL SITUATIONS, SO AS TO SUGGEST PATTERNS OF UPTAKE AND DISTRIBUTION THAT ARE NOT CORRELATED WITH NEUROTOXICITY. THESE STUDIES WILL A) ESTABLISH HOW THE DISORDERED FLOW OF LEAD ACROSS NEURAL BARRIERS THAT WE HAVE NOTED IN LEAD ENCEPHALOPATHY CONTRIBUTES TO ITS PATHOGENESIS; B) ALLOW DEVELOPMENT OF PREDICTIVE TESTS FOR NEURAL TOXICITY OF POTENTIAL TOXINS AND POLLUTANTS BY TESTING THEIR EFFECTS ON BARRIER

****PROJECT: 04188-FUNCTION OF METALLOTHIONEIN IN HEAVY METAL METABOLISM**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 36474
 TASK CODE=V625F-31 **EPA-D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: FO BRADY UNIV OF SOUTH DAKOTA SCH OF ARTS & SCI
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES.: RECN-004188 SSIE-GMA 4755 EPA -D5-E772 TASK-V625F-31
 AP -625F DU -N140 LABT-EMI
 ABSTRACT..... THE LOW MOLECULAR WEIGHT, CYSTEINE-RICH PROTEIN METALLOTHIONEIN WILL BE STUDIED UNDER A VARIETY OF CONDITIONS IN ORDER TO ELUCIDATE ITS FUNCTION IN HEAVY METAL METABOLISM. ITS INVOLVEMENT IN THE MECHANISMS OF INCORPORATION, METABOLISM, DEPOSITION AND TURNOVER OF HAZARDOUS TOXIC METALS, WHICH ARE BECOMING INCREASINGLY PREVALENT IN THE ENVIRONMENT AS BYPRODUCTS ASSOCIATED WITH VARIOUS ENERGY RELATED TECHNOLOGIES, WILL BE ELUCIDATED. SPECIFICALLY, THE FOCUS OF THESE STUDIES WILL BE ON THE MECHANISMS OF ACTION AND SITES OF LOCALIZATION AND TRANSFER OF HEAVY METALS IN PERFUSED RAT LUNGS, AND POSSIBLY LIVERS AND KIDNEYS, (BOTH IN VIVO AND EX VIVO) AND IN RATS (BOTH ADULTS AND NEONATES). THE HEAVY METALS OF INTEREST IN THIS STUDY ARE ZINC, COPPER, CADMIUM, MERCURY, NICKEL, AND THALLIUM. INITIALLY, THESE WILL BE STUDIED INDIVIDUALLY AS A PRELIMINARY TO MORE IMPORTANT EXPERIMENTS WHICH WILL INVOLVE THE STUDY OF INTERACTIONS OF TWO OR MORE OF THESE METALS, E.G., A SITUATION WHICH IS MORE LIKELY TO OCCUR UNDER ENVIRONMENTAL CONDITIONS. THE GOAL OF THESE STUDIES IS TO ESTABLISH WHETHER METALLOTHIONEIN IS FUNCTIONING IN DETOXICATION OF TOXIC HEAVY METALS. THE PRESENCE OF TOXIC HEAVY METALS SERVING TO INTERFERE WITH THESE NORMAL PROCESSES.

****PROJECT: 04187-BIOLOGICAL EFFECTS OF 60 HERTZ ELECTRIC FIELDS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 31000
 TASK CODE=V625F-32 **EPA-D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: AA MARINO STATE UNIVERSITY OF NEW YORK
 RO BECKER STATE UNIVERSITY OF NEW YORK
 JA SPADARO STATE UNIVERSITY OF NEW YORK
 MILESTONES.... 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES.: RECN-004187 SSIE-GMA 4752 EPA -D5-E772 TASK-V625F-32
 AP -625F DU -N140 LABT-EMI
 ABSTRACT..... 60 HERTZ ELECTRIC FIELDS ARISING FROM ELECTRIC POWER TRANSMISSION LINES ARE UBIQUITOUSLY PRESENT IN THE ENVIRONMENT. THE STRENGTH OF SUCH FIELDS VARIES DIRECTLY WITH THE OPERATION VOLTAGE OF THE TRANSMISSION LINE AND INVERSELY WITH DISTANCE FROM THE LINE. BIOLOGICAL EFFECTS ATTRIBUTABLE TO LOW FREQUENCY ELECTRIC FIELD EXPOSURE HAVE RECENTLY BEEN DESCRIBED. NOTWITHSTANDING EARLIER WORK MINIMIZING THE BIOLOGICAL SIGNIFICANCE OF SUCH FIELDS, PRELIMINARY RESULTS OBTAINED IN OUR LABORATORY SHOW THAT A 60 HERTZ ELECTRIC FIELD OF 150 VOLTS/CM IS A BIOLOGICAL STRESSOR. THAT IS, FIELD EXPOSURE ALTERS NORMAL GROWTH IN RATS AND MICE AND PRODUCES CHANGES IN THE LEVELS OF SERUM HYDROXYCORTICOSTERONE AND SERUM PROTEINS. THIS PROJECT INVOLVES THE SYSTEMATIC STUDY OF THESE PHENOMENA IN GREATER DETAIL. PRESENTLY, THE HUMAN HEALTH HAZARD ASSOCIATED WITH EXPOSURE TO 60 HERTZ ELECTRIC FIELDS IS UNKNOWN. THERE HAVE BEEN NO SYSTEMATIC STUDIES OF SUCH EFFECTS AND CONSEQUENTLY THERE ARE NO FEDERAL OR STATE STANDARDS FOR PERMISSIBLE NON-OCCUPATIONALLY RELATED EXPOSURE. CONTINUING OUR INITIAL WORK, WE PROPOSE THE FOLLOWING EXPERIMENTS TO EVALUATE THE BIOLOGICAL EFFECTS OF 60 HERTZ ELECTRIC FIELDS AT 150 VOLTS/CM: 1. THE EFFECT IN RATS ON SERUM HYDROXYCORTICOSTERONE, TRIGLYCERIDES, TOTAL PROTEINS AND THE EFFECT ON GROWTH, TISSUE STRUCTURE AND FOOD AND WATER CONSUMPTION. 2. THE EFFECT ON REPRODUCTION IN MICE. 3. THE EFFECT IN RABBITS OF ACUTE AND CHRONIC EXPOSURE. THE EXPERIMENTS WILL BE REPEATED AS A FUNCTION STRENGTH AND FREQUENCY.

****PROJECT: 04188-FACTORS AFFECTING IRRITANT POTENCY OF GASES AND AEROSOLS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ B2000
 TASK CODE=V625F-33 **EPA-D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: MD AMDUR HARVARD UNIV PUBLIC HEALTH/PHYS DEPT
 DW UNDERHILL HARVARD UNIV PUBLIC HEALTH/PHYS DEPT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES.: RECN-004188 SSIE-GMA 4747 EPA -D5-E772 TASK-V625F-33
 AP -625F DU -N140 LABT-EMI
 ABSTRACT..... WE PROPOSE TO EXAMINE THE JOINT TOXIC ACTION OF SULFUR DIOXIDE AND OZONE. CONCENTRATIONS USED WILL BE IN THE RANGE OF 0.2-0.8 PPM OF EACH GAS. THEY WILL BE COMBINED IN EQUAL CONCENTRATIONS AS WELL AS IN VARYING RATIOS. THE CRITERIA OF IRRITANT RESPONSE WILL BE ALTERATIONS IN THE RESPIRATORY MECHANICS OF GUINEA PIGS. THE RESPONSE TO THE COMBINATION WILL BE COMPARED TO PREVIOUSLY OBSERVED CHANGES PRODUCED BY SULFURIC ACID. WE ALSO PLAN TO STUDY THE UPTAKE OF SULFUR DIOXIDE BY WETTED WALL TUBES WITH AND WITHOUT THE ADDITION OF AEROSOLS. WE PLAN TO STUDY THE SOLUBILITY AND REACTIVITY OF SULFUR DIOXIDE IN SOLUTIONS OF VARIOUS SALTS WHICH HAVE BEEN SHOWN TO POTENTIATE THE BIOLOGICAL RESPONSE

****PROJECT: 04189-RESPIRATORY TRACT DEPOSITION OF INHALED AEROSOLS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 52000
 TASK CODE=V625F-34 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: CP YU STATE UNIVERSITY OF NEW YORK
 DB TAULBEE STATE UNIVERSITY OF NEW YORK
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-004189 SSIE-GMA 4749 EPA -D5-E772 TASK-V625F-34
 AP -625F DU -N140 LABT-EMI
 ABSTRACT..... MATHEMATICAL MODELS ARE TO BE DEVELOPED FOR THEORETICAL PREDICTION OF PARTICLE DEPOSITION AND DISTRIBUTION ALONG THE RESPIRATORY TRACT SYSTEM. SPECIFICALLY, THE FOLLOWING TASKS ARE TO BE UNDERTAKEN DURING THE PERIOD OF REQUESTED SUPPORT: 1. DEVELOP A MATHEMATICAL MODEL FOR DEPOSITION IN MAN AT NOSE-BREATHING. 2. RECOMMEND FIGURES FOR THE REGIONAL DEPOSITION IN THE HUMAN LUNG AT NOSE AND MOUTH-BREATHING UNDER VARIOUS WORKING CONDITIONS. EMPHASIS WILL BE GIVEN TO FINE PARTICLES WHICH ARE DIFFICULT TO BE REMOVED FROM POWER PLANT EMISSIONS. 3. DEVELOP A MATHEMATICAL MODEL FOR DEPOSITION IN SMOKERS AND PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE. 4. DEVELOP A MATHEMATICAL MODEL FOR DEPOSITION IN EXPERIMENTAL ANIMALS. THE BASIC METHOD TO BE USED IS THE ONE PREVIOUSLY DEVELOPED BY THE PRINCIPAL INVESTIGATOR AND HIS FACU

****PROJECT: 04190-TRACE ELEMENT DEPOSITION IN AMBIENT AEROSOL INHALATION**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 57104
 TASK CODE=V625F-35 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI DEPT OF OCEANOGRAPHY
 INVESTIGATOR.: JW WINCHESTER FLORIDA STATE UNIV
 MILESTONES... 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-004190 SSIE-GMA 4748 EPA -D5-E772 TASK-V625F-35
 AP -625F DU -N140 LABT-EMI
 ABSTRACT..... THE RESPONSE TO INHALATION OF AMBIENT AEROSOL PARTICLES FROM INDOOR AND SELECTED OUTDOOR ENVIRONMENTS WILL BE INVESTIGATED USING HIGH SENSITIVITY ELEMENTAL ANALYSIS BY PROTON INDUCED X-RAY EMISSION. PIXE, THE RESPONSE MAY INCLUDE BOTH DEPOSITION OF PARTICLES IN THE RESPIRATORY TRACT AND GROWTH IN PARTICLE SIZE DUE TO EXPOSURE TO HIGH RELATIVE HUMIDITY DURING BREATHING. BOTH RESPONSES MAY DEPEND ON PARTICLE SIZE AND ON CHEMICAL COM-OSITION OF THE PARTICLES AND MAY BE DIFFERENT FOR DIFFERENT COMPONENT PARTICLES IN A MIXED AEROSOL. THE DIFFERENT COMPONENTS MAY BE DISTINGUISHED BY THEIR DIFFERENT ELEMENTAL COMPOSITION. AND THE RESPIRATORY RESPONSE OF EACH MAY BE DETERMINED IN A SINGLE EXPERIMENT. SAMPLES WILL BE TAKEN BY 5 STAGE CASCADE IMPACTOR WITH FINE PARTICLE FILTER AND WILL PROVIDE RESOLUTION OF PARTICLES FROM LESS THAN 0.25 TO GREATER THAN 4 MICRONS EQUIVALENT AERODYNAMIC DIAMETER. EACH SIZE RANGE IS ANALYZED FOR ITS ELEMENTAL CONSTITUENTS BY PIXE, INCLUDING S, CL, K, CA, TI, V, CR, MN, FE, NI, CU, ZN, BR, PB, ZR, CD, AND ADDITIONAL HEAVY METALS IF PRESENT IN THE AEROSOL. THE NANOGRAM SENSITIVITY OF THE PIXE TECHNIQUE PERMITS FINE PARTICLE SIZE RESOLUTION AT A SAMPLING RATE OF 1 LITER/MINUTE AND REQUIRES OF HUMAN SUBJECTS ONLY 10 MINUTES OR LESS OF BREATHING TIME PER SAMPLE. EXPERIMENTS ARE CARRIED OUT USING AMBIENT AEROSOL FROM DIFFERENT ACTUAL ENVIRONMENTS AND DO NOT REQUIRE THE USE OF SPECIAL TRACER MATERIALS. A MAJOR OBJECTIVE OF THE RESEARCH WILL BE TO STANDARDIZE EXPERIMENTAL CONDITIONS AND DEVELOP A COMPACT AND PORTABLE SAMPLING UNIT WHICH CAN BE USED IN MORE SPECIALIZED MEDICAL TESTS OF INHALATION RESPONSE POLLUTION AEROSOL PARTICLES.

****PROJECT: 04192-REGIONAL DEPOSITION OF INHALED PARTICLES IN MAN**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 74777
 TASK CODE=V625F-36 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: M LIPPMANN NEW YORK UNIV
 RE ALBERT NEW YORK UNIV
 RB SCHLESINGER NEW YORK UNIV
 MILESTONES... 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-004192 SSIE-GMA 4753 EPA -D5-E772 TASK-V625F-36
 AP -625F DU -N140 LABT-EMI
 ABSTRACT..... THE OBJECTIVE OF THIS RESEARCH PROGRAM IS TO DEVELOP AND REFINE REALISTIC PREDICTIVE MODELS FOR PARTICLE DEPOSITION EFFICIENCIES AND PATTERNS IN THE HUMAN TRACHEOBronchial TREE. THE MODELS WILL COVER RESPIRABLE PARTICLES OF ALL SIZES, A WIDE RANGE OF CONSTANT AND CYCLIC RESPIRATORY FLOWS, AND BE APPLICABLE TO POPULATION SUBGROUPS AS WELL AS AVERAGES. THEY WILL BE BASED UPON AVAILABLE DATA FROM STUDIES ON HUMANS IN VIVO, AND AVAILABLE DATA AND NEW DATA ON THE DISTRIBUTION OF DEPOSITION IN HOLLOW BRONCHIAL CASTS. THE NEW STUDIES WILL BE PERFORMED USING GAMMA-TAGGED MONODISPERSE AEROSOLS. TWELVE NEW BRONCHIAL CASTS WHICH EXTEND TO 2 MM AIRWAYS, NEW REPLICATE LARGE AIRWAY CASTS, NEW MULTIPLE LOBULE CASTS OF AIRWAYS LESS THAN OR EQUAL TO 2 MM, AND APPROPRIATE COLLIMATED SCINTILLATION DETECTORS. A VARIABLE ORIFICE LARYNX MODEL WILL BE CONSTRUCTED FOR THE DEPOSITION STUDIES WITH CYCLIC FLOWS. HIGH RESOLUTION SURFACE DENSITY MEASUREMENTS WILL BE MADE BY COUNTING THE NUMBERS OF PARTICLES ON BIFURCATIONS AND OTHER SELECTED CAST SURFACES WITH A SCANNING ELECTRON MICROSCOPE. THESE MEASUREMENTS WILL ESTABLISH CONCENTRATIONS FACTORS AND IDENTIFY LOCATIONS FOR THE CELLS WITH THE HIGHEST EXPOSURES TO INHALED PARTICLES; THEREBY PROVIDING A BASIS FOR THE DEPOSITION COMPONENTS OF AN AIRWAY SURFACE DOSIMETRY MODEL RELATED TO HUMAN BR

****PROJECT: 04194-EFFECTS OF ENVIRONMENTAL AGENTS ON MALE AND FEMALE REPRODUCTIVE TRACT**

FUNCTION
 STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=V625F-37 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: J DAVIS ENDOCRINE LABS OF MADISON INC
 MILESTONES...: 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: RECN-004194 SSIE-GMA 4754 EPA -D5-E772 TASK-V625F-37
 AP -625F DU -N140 LABT-EMI
 ABSTRACT.....: A SERIES OF EXPERIMENTS ARE DESCRIBED WHICH WILL PROVIDE INFORMATION ON THE EFFECTS OF 24 SELECTED XENOBIOTICS (6 PER ANNUM) ON THE FERTILITY OF MICE (MALE AND FEMALE) FOLLOWING PRENATAL OR POSTNATAL EXPOSURE, AND, DETERMINE IF LEVELS OF REPRODUCTIVE HORMONES HAVE DEVIATED FROM THE NORM OR IF A PATHOLOGIC CONDITION EXISTS IN MICE WHOSE REPRODUCTIVE CAPACITY HAS BEEN ALTERED. INFORMATION WILL BE OBTAINED ON THE POSSIBLE DEVELOPMENTAL TOXICITY OF THESE CHEMICALS, FOCUSING ON TRANSPLACENTAL CARCINOGENESIS.

****PROJECT: 04195-EFFECTS OF 60 HZ FIELDS ON THE MAMMALIAN CENTRAL NERVOUS SYSTEM**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 60000
 TASK CODE=V625F-38 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: WR ADEV UNIV OF CALIFORNIA SCH OF MED/ANATOMY DEPT
 MILESTONES...: 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: RECN-004195 SSIE-GMA 4744 EPA -D5-E772 TASK-V625F-38
 AP -625F DU -N140 LABT-EMI
 ABSTRACT.....: OBJECTIVES: THE OBJECTIVES OF THIS RESEARCH ARE TO DETERMINE THE EFFECTS OF 60 HZ FIELDS FROM HIGH VOLTAGE TRANSMISSION LINES ON THE CENTRAL NERVOUS SYSTEM OF MAMMALS. METHODS EMPLOYED: ENVIRONMENTAL FIELD CONDITIONS SIMILAR TO THOSE FOUND IN THE VICINITY OF HIGH VOLTAGE TRANSMISSION LINES WILL BE SIMULATED. THESE FIELD GRADIENTS WILL RANGE FROM 1 TO 2000 VOLTS/METER. THE EFFECTS OF THESE FIELDS ON THE BIOLOGICAL RHYTHMS IN RATS WILL BE EVALUATED. THE EFFECTS ON THE NEUROENDOCRINE MECHANISM IN RATS WILL BE EXAMINED BY USING 17-HYDROXYSTERIODS, CALCIUM, PHOSPHORUS, VANILAMANDLIC ACID AND OTHER URINARY INDICATORS OF BIORHYTHMICITY. CHANGES IN THE NEUROCHEMISTRY OF BRAIN TISSUE OF CATS WILL BE STUDIED. THESE STUDIES WILL INCLUDE THE MEASUREMENT OF BOTH CA 2 ION AMINO ACID EFFLUXES FROM THE CEREBRAL CORTEX OF THE CAT. MAJOR FINDINGS: EXPOSURE OF RATS TO ELECTRIC FIELDS OF 50 VOLTS/METER, AND 500 VOLTS/METER HAVE BEEN COMPLETED. ACTIVITY MEASUREMENTS AT 50 VOLTS/METER SHOWED NO DIFFERENCES AS COMPARED TO THE CONTROLS. AT 500 VOLTS/METER AN INCREASE IN ACTIVITY OF THE EXPOSED OVER THE CONTROLS WERE MEASURED. AT BOTH 50 VOLTS/METER AND 500 VOLTS/METER AN INCREASE IN URINE OUTPUT WAS MEASURED WITH NO INCREASE IN WATER INTAKE. AT 500 VOLTS/METER NO CHANGE IN GROWTH RATE WAS OBSERVED. HOWEVER, AT 500 VOLTS/METER A SLOWER WEIGHT GAIN WAS MEASURED. THYROID AND ADRENAL TISSUE WEIGHTS WERE TAKEN AT THE END OF EXPOSURE. AVERAGE WEIGHTS OF WET ADRENAL TISSUE WAS HIGHER (56.8 MG) FOR THE 500 VOLTS/METER SERIES THAN IN THE CONTROL GROUP (43.1 MG). HOWEVER, NO DIFFERENCES WERE DETECTED IN AVERAGED WET THYROID TISSUE WEIGHTS (19.0 VERSUS 18.5 MG).

****PROJECT: 04196-ASSESSMENT OF NEUROBEHAVIORAL CONSEQUENCES OF ENERGY RELATED ENVIRONMENTAL FACTORS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 125000
 TASK CODE=V625F-39 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: CL MITCHELL US HEW NATL INST OF HLTH /PHS
 HA TILSON US HEW NATL INST OF HLTH /PHS
 PA CABE US HEW NATL INST OF HLTH /PHS
 RE SQUIBB US HEW NATL INST OF HLTH /PHS
 MILESTONES...: 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: RECN-004196 SSIE-GMA 4739 EPA -D5-E772 TASK-V625F-39
 AP -625F DU -N140 LABT-EMI
 ABSTRACT.....: THERE IS CONSIDERABLE CONCERN ABOUT THE POSSIBILITY FOR SUBTLE NEUROBEHAVIORAL CHANGES RESULTING FROM LOW-LEVEL CHRONIC EXPOSURE TO ENERGY RELATED POLLUTANTS. UNFORTUNATELY, THERE IS ONLY LIMITED AGREEMENT AS TO THE SENSITIVITY AND UTILITY OF MANY COMMONLY USED NEUROBEHAVIORAL TESTS IN ANIMALS FOR THE EXTRAPOLATION OF RISKS TO HUMANS. THEREFORE, THE CURRENT WORK SEEKS TO PROVIDE A STRATEGY AIMED AT RESOLVING THIS IMPORTANT PROBLEM. TEST VALIDATION WILL BE ACCOMPLISHED BY EVALUATING KNOWN NEUROTOXINS IN A BATTERY OF TESTS CHOSEN TO ASSESS IN ANIMAL MODELS A WIDE RANGE OF EFFECTS BASED ON REPORTED HUMAN TOXICOSIS SYMPTOMATOLOGY. PHENOMENA TO BE MEASURED ARE ONGOING HOME CAGE MOTOR ACTIVITY, FOOD CONSUMPTION, WATER CONSUMPTION (AND THE DIURNAL CYCLING OF THESE), NEUROLOGICAL/PHYSIOLOGICAL INDICES (REFLEXES, AUTONOMIC SIGNS, EQUILIBRIUM/GAIT, BALANCE, TREMOR REACTIVITY, AND MUSCULAR STRENGTH), AND ASPECTS OF COGNITIVE AND ASSOCIATIVE BEHAVIOR INVOLVING BOTH ENDOGENOUS AND EXOGENOUS (SENSORY) CONTROL OF RESPONDING. AN INTEGRATED TIME SCHEME COVERING 90 DAYS OF CHEMICAL TREATMENT AND 30 DAYS OF POST-DOSE RECOVERY WILL BE USED. BY COMPARING THE OBSERVED RESULTS OF THE NEUROTOXINS IN THE ANIMAL MODELS WITH THE PREDICTED EFFECTS BASED ON REPORTED HUMAN SYMPTOMATOLOGY, SOME DECISION CONCERNING THE VALIDITY

****PROJECT: 04197-CHEMICALLY INDUCED MUTATIONS AT BIOCHEMICAL LOCI IN MICE**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 246400
 TASK CODE=V625F-40 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: F JOHNSON US HEW
 MILESTONES...: 07/78 -SEMIANNUAL PROGRESS REPORT NATL INST OF HLTH /PHS
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: RECN-004197 SSIE-GMA 4745 EPA -D5-E772 TASK-V625F-40
 AP -625F DU -N140 LABT-EMI
 ABSTRACT.....: ALTHOUGH IN THEORY ALKYLATING AGENTS SUCH AS TEM SHOULD BE CAPABLE OF INDUCING GENE MUTATIONS IN MAMMALS, ONLY A RELATIVELY SMALL AMOUNT OF DATA ARE AVAILABLE SUPPORTING THIS HYPOTHESIS. THE OBJECTIVE OF THIS STUDY WAS TO TEST THE EFFECTIVENESS OF A CHEMICAL MUTAGEN IN INDUCING MUTATIONS AT A NUMBER OF DIFFERENT ENZYME LOCI IN THE MOUSE. STRAIN DBA/2J MALES WERE EXPOSED TO TRIETHYLENEMELIMINE (TEM) BY I.P. INJECTION. CONTROL MALES WERE INJECTED WITH THE CARRIER (HBSS). MALES WERE MATED TO C57BL/6J FEMALES. KIDNEYS AND BLOOD WERE OBTAINED FROM ALL F1 OFFSPRING AND SAID TISSUES WERE ANALYZED BY STARCH GEL ELECTROPHORESIS FOR THE OCCURRENCE OF MUTATIONS AT THE VARIOUS ENZYME LOCI. A NUMBER OF PUTATIVE MUTANTS HAVE BEEN IDENTIFIED IN THIS EXPERIMENT AND PROGENY TESTING IS UNDERWAY TO CONFIRM THESE MUTATIONS.

****PROJECT: 04198-LEAD TOXICITY AND ENERGY METABOLISM IN IMMATURE BRAIN**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 70527
 TASK CODE=V625F-41 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: SD HOLTZMAN STANFORD UNIV SCH OF MED
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: RECN-004198 SSIE-GMA 4740 EPA -D5-E772 TASK-V625F-41
 AP -625F DU -N140 LABT-EMI
 ABSTRACT.....: LEAD IS A UBIQUITOUS TOXIC POLLUTANT. THE MOST SERIOUS MANIFESTATION OF PEDIATRIC LEAD POISONING IS AN ACUTE ENCEPHALOPATHY. IN ADDITION, THE RISING BURDEN OF ENVIRONMENTAL LEAD MAY BE PRODUCING SIGNIFICANT BRAIN DAMAGE, WITHOUT OVERT ENCEPHALOPATHY, IN YOUNG CHILDREN, IN THE UNBORN FETUS, AND THE NEONATE. PATHOLOGIC STUDIES SUGGEST THAT LEAD PRODUCES EDEMA AND CAPILLARY CHANGES AT A "CRITICAL" TIME IN THE IMMATURE BRAIN OF THE HUMAN AND IN A RAT MODEL OF LEAD ENCEPHALOPATHY. THIS "CRITICAL" PERIOD IN THE RAT CONTAINS MANY AGE-DEPENDENT CHANGES IN ENERGY METABOLISM INCLUDING ACTIVITIES OF THE ELECTRON TRANSPORT CHAIN (ETC) AS DESCRIBED BY THIS INVESTIGATOR AND OTHERS. LEAD DOES ACT ON THE ETC IN OTHER TISSUES. HOWEVER, THERE ARE NO STUDIES IN IMMATURE BRAIN OF LEAD EFFECTS ON THE ETC. A PROBABLE BASIC STEP IN THE PATHOGENESIS OF LEAD ENCEPHALOPATHY. PRELIMINARY RESULTS ARE PRESENTED ON EFFECTS OF LEAD ON OXIDATIVE PHOSPHORYLATION IN IMMATURE RAT BRAIN MITOCHONDRIA. WITHIN 2 DAYS OF FEEDING LEAD TO 2 WEEK OLD ANIMALS, RESPIRATION WITH NAD-LINKED SUBSTRATES IS UNCOUPLED, REFLECTING AN INCREASED STATE 4 RATE. DURING THE SUBSEQUENT 2 WEEK PRE-ENCEPHALITIC PERIOD OF LEAD FEEDINGS, BOTH STATE 3 AND 4 RATES BECOME INCREASINGLY DEPRESSED. CYTOCHROME OXIDASE ACTIVITY SHOWS THE SAME CHANGES. THESE EFFECTS ARE MORE SIGNIFICANT IN CEREBELLAR THAN IN CEREBRAL HEMISPHERE MITOCHONDRIA. IMPORTANTLY, THESE EFFECTS OF LEAD OCCUR EARLIER THAN PREVIOUSLY REPORTED CHANGES IN BRAIN FLUID, ELECTROLYTES, AND MORPHOLOGY. CONSIDERING THE PRELIMINARY RESULTS AND OBSERVATIONS OUTLINED ABOVE, INVESTIGATIONS ARE PROPOSED BASED ON THESE HYPOTHESES: A) THE PRIMARY EFFECT OF LEAD IN DEVELOPING BRAIN IS ON ENERGY METABOLISM: SPECIFICALLY ON SITES IN THE ETC; AND B) THIS EFFECT IS BASIC TO THE TOXIC EFFECTS OF LEAD. EXPERIMENTS ARE DESIGNED TO DELINEATE THE SITES AND MECHANISMS OF ACTION OF LEAD TO LEARN MORE OF THE PROPERTIES OF THE ETC IN IMMATURE BRAIN AND OF THE PATHOGENESIS OF LEAD ENCEPHALOPATHY. YOUNGER ANIMALS WILL BE STUDIED TO DELINEATE POTENTIAL EFFECTS OF LEAD ON THE BRAIN OF THE HUMAN FETUS AND NEONATE.

****PROJECT: 04199-ENVIRONMENTAL MUTAGEN INFORMATION CENTER**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 31000
 TASK CODE=V625F-42 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: JS WASSON US DOE OAK RIDGE LAB INFORMATION CTR COMPLEX
 MILESTONES...: 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: RECN-004199 SSIE-GMA 4737 EPA -D5-E772 TASK-V625F-42
 AP -625F DU -N140 LABT-EMI
 ABSTRACT.....: OBJECTIVES: THE MISSION OF THE ENVIRONMENTAL MUTAGEN INFORMATION CENTER (EMIC) IS TO COLLECT, ORGANIZE, AND DISSEMINATE CHEMICAL MUTAGENESIS INFORMATION. MAJOR FINDINGS AND PROPOSED COURSE: EMIC'S DATA FILE AT THE END OF MARCH 1977 CONTAINED 19,000 BIBLIOGRAPHIC ENTRIES. OF THESE, APPROXIMATELY 18,000 HAVE BEEN INDEXED WITH RESPECT TO AGENT(S), ORGANISM(S), AND CHEMICAL ABSTRACT SERVICE REGISTRY NUMBER(S). THE CENTER PROCESSES REQUESTS FOR INFORMATION AT A RATE OF 2-3 PER DAY. THESE REQUESTS COME PRIMARILY FROM GOVERNMENTAL AGENCIES IN THE UNITED STATES OR GOVERNMENT SUPPORTED RESEARCH IN UNIVERSITIES. SEVERAL REQUESTS FROM OTHER COUNTRIES ARE ALSO RECEIVED. THE EMIC DATA BANK CAN NOW BE SCREENED BY TOXLINE. EMIC WILL CONTINUE TO MONITOR THE WORLD SCIENTIFIC LITERATURE FOR REPORTS ON CHEMICAL MUTAGENESIS. IT WILL ISSUE ITS ANNUAL LITERATURE SURVEY IN THE MIDDLE OF THE FISCAL YEAR. THIS REPORT WILL INCLUDE AN INDEX TO TEST ORGANISMS OR TEST OBJECTIVES AS WELL AS INDEXES FOR AGENTS AND SELECTED TITLE KEYWORDS. AS GREAT A PORTION AS POSSIBLE OF EMIC'S TOTAL BIBLIOGRAPHIC ENTRIES WILL BE KEYWORDED WITH RESPECT TO AGENT, TEST ORGANISM, AND TEST OBJECT. EMIC WILL CONTINUE TO ANSWER SELECTED REQUESTS FOR SPECIAL INFORMATION FROM THE SCIENTIFIC, EDUCATION, AND INDUSTRIAL COMMUNITIES. TABULAR EXTRACTS OF THE DATA FROM LITERATURE WILL BE ADDED TO THE DATA FILE AS THEY ARE PREPARED IN CONJUNCTION WITH THE TIMELY STATE-OF-ART REPORTS ON SUBJECTS OF CURRENT SCIENTIFIC INTEREST.

****PROJECT: 04201-CHEMICAL AND ENVIRONMENTAL MUTAGEN STUDIES UTILIZING THE TRADESCANTIA TEST SYSTEM**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 150000
 TASK CODE=V625F-43 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: J VANTHOF BROOKHAVEN NATL LAB
 RL DIVON US HEW NATL INST OF HLTH /PHS

MILESTONES.... 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT

PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-004201 SSIE-GMA 4741 EPA -D5-E772 TASK-V625F-43
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... WE HAVE DEMONSTRATED THAT METHODS DEVELOPED FOR STUDYING THE EFFECTS OF PHYSICAL MUTAGENS UTILIZING THE TRADESCANTIA GENETIC TEST SYSTEM CAN BE APPLIED WITH VERY LITTLE MODIFICATION TO CHEMICAL MUTAGEN INVESTIGATIONS. ALSO, DOSE RESPONSE DATA FROM PHYSICAL MUTAGEN TREATMENTS CAN BE USED FOR BASELINE COMPARISONS WITH DATA FROM CHEMICAL MUTAGEN EXPERIMENTS. PRESENT DATA INDICATE THAT THE SYSTEM IS SENSITIVE ENOUGH TO DETECT A SIGNIFICANT INCREASE IN MUTATION FREQUENCIES AT LEVELS WELL BELOW 1 PPM FOR SOME GASEOUS MUTAGENS. RESEARCH WILL CONTINUE USING VARIOUS CHEMICALS AND AIR POLLUTANTS SUSPECTED OR KNOWN TO BE MUTAGENIC. GREATER EFFICIENCY OF THE TEST SYSTEM WILL BE SOUGHT, THROUGH BASIC GENETIC STUDIES AND A BREEDING PROGRAM AIMED AT OBTAINING MORE SENSITIVE CLONES, DEIVING MORE EFFECTIVE CHEMICAL MUTAGEN EXPOSURE METHO

****PROJECT: 04202-MONITORING MUTAGENS (CLASTOGENS) WITH MAMMALIAN CHROMOSOMES**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 116863
 TASK CODE=V625F-44 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: TC HSU UNIVERSITY OF TEXAS
 FE ARRIGHI UNIVERSITY OF TEXAS

MILESTONES.... 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT

PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-004202 SSIE-GMA 4759 EPA -D5-E772 TASK-V625F-44
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... THERE IS AN URGENT NEED FOR DEVISING AND STANDARDIZING PROCEDURES FOR MONITORING THE EFFECTS OF ENVIRONMENTAL MUTAGENS ON THE GENETIC SYSTEMS OF HIGHER ANIMALS. FOR PRACTICAL PURPOSES, THESE PROCEDURES SHOULD BE RELATIVELY INEXPENSIVE, NOT LABORIOUS, EASILY QUANTITATED, AND THE TEST OBJECTS SHOULD BE RELATED TO THE GENETIC SYSTEM OF MAN AND OTHER MAMMALS. CHROMOSOMES OF CELLS IN CULTURE FULFILL ALL THESE CRITERIA AND SHOULD BE ONE OF THE MOST SUITABLE TESTING MATERIALS. SINCE MOST MUTAGENS INDUCE CHROMOSOME DAMAGE (HENCE THEY ARE ALSO CLASTOGENS), CHROMOSOME DAMAGE SHOULD SERVE AS A CONSERVATIVE INDICATOR OF GENE DAMAGE. HOWEVER, INVESTIGATORS IN THE PAST USED VARIOUS TEST OBJECTS (MANY WERE POOR MATERIALS) AND TEST SYSTEMS (MANY HAPHAZARDLY DESIGNED), SO THEIR DATA ARE INCOMPLETE AND ARE NOT STRICTLY COMPARABLE. THIS PROJECT IS DESIGNED TO SYSTEMATICALLY TEST SEVERAL CYTOLOGICALLY ADVANTAGEOUS MATERIALS AND TO DETERMINE THE MOST EFFICIENT, ECONOMICAL AND INFORMATION-YIELDING PROTOCOL FOR FUTURE SCREENING OF ENVIRONMENTAL MUTAGENS. OUR TEST MATERIALS INCLUDE, IN ADDITION TO DIPLOID HUMAN FIBROBLASTS, CELLS OF THE CHINESE HAMSTER (FOR ITS FAST GROWTH RATE AND GOOD CHROMOSOMES), THE INDIAN MUNTJAC (FOR ITS VERY LOW DIPLOID NUMBER, 2N EQUALS 6), TWO SPECIES OF THE DEER MICE (DIFFERING DRASTICALLY IN THE AMOUNT OF CONSTITUTIVE HETEROCHROMATIN AND REPETITIVE DNA CONTENT), THE LABORATORY MOUSE, AND SEVERAL OTHER SPECIES. TEST COMPOUNDS WILL INCLUDE WELL-KNOWN CLASTOGENS, PROBABLE CLASTOGENS AND UNTESTED CHEMICALS. THE DRUG EXPERIMENTS WILL CONSIST OF CONTINUOUS TREATMENTS (TO DETERMINE INHIBITION OF MITOSIS, STICKINESS, CHROMOSOME ORIENTATION, BREAKS AND SUBSEQUENT ABERRATIONS), ABERRATIONS IN THE RECOVERY POPULATIONS AFTER PULSE TREATMENTS, FREQUENCY OF SISTER CHROMATID EXCHANGES WHEN THE CELLS ARE TREATED WITH 5-BROMODEOXYURIDINE IN CONJUNCTION WITH TEST COMPOUNDS, AND OTHER CYTOGENETIC CHARACTERISTICS. ALSO, WE PLAN TO USE CHICK EMBRYOS IN VIVO TO TEST THE POSSIBILITY OF USING DEVELOPING

****PROJECT: 04204-RISK ASSESSMENT FOR ENVIRONMENTAL CARCINOGENS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 5000
 TASK CODE=V625F-45 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: DG HOEL US HEW NATL INST OF HLTH /PHS
 HA GUESS US HEW NATL INST OF HLTH /PHS

PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-004204 SSIE-GMA 4760 EPA -D5-E772 TASK-V625F-45
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... THE PURPOSE OF THIS PROJECT IS TO DEVELOP IMPROVED STATISTICAL TECHNIQUES FOR USING DATA FROM ANIMAL CARCINOGENICITY TESTS CONDUCTED AT HIGH DOSE LEVELS TO ESTIMATE LONG TERM RISK FROM CHEMICAL CARCINOGENS AT VERY LOW DOSE LEVELS. EXISTING TECHNIQUES ARE EVALUATED AND NEW TECHNIQUES ARE STUDIED, WITH PARTICULAR EMPHASIS ON THOSE WHICH ATTEMPT TO RELATE MECHANISTICALLY TO THE CARCINOGENIC PROCESS.

****PROJECT: 04205-STATISTICAL DEVELOPMENT OF MULTISTAGE CARCINOGENESIS MODELS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=V625F-46 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: DG HOEL US HEW
 MILESTONES...: 07/78 -SEMIANNUAL PROGRESS REPORT NATL INST OF HLTH /PHS
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-N-004205 SSIE-GMA 4767 EPA -D5-E772 TASK-V625F-46
 AP -625F DU -N140 LABT-EMI
 ABSTRACT.....: OBJECTIVE: TO IMPROVE METHODS FOR ESTIMATING HUMAN CANCER RISKS FROM ENVIRONMENTAL CONTAMINANTS. THESE RISK ESTIMATES ARE TO BE BASED UPON LABORATORY DATA TYPICALLY FROM CHRONIC FEEDING STUDIES IN RODENTS. APPROACH: THE MULTISTAGE MODEL FOR CARCINOGENESIS IS USED TO REPRESENT THE DOSE RESPONSE CURVE FOR EXTRAPOLATION OF HIGH DOSE EFFECTS TO LOW DOSE EFFECTS. PRODUCT/RESULTS EXPECTED: THE FOLLOWING RESULTS ARE EXPECTED: A) EFFECTS OF COMPETING RISKS ARE TO BE INVESTIGATED; B) DEVELOPMENT OF STATISTICAL DESIGNS OF EXPERIMENTS FOR LOW DOSE ESTIMATION; C) GOODNESS-OF-FIT COMPARISONS OF SEVERAL MODELS.

****PROJECT: 04207-LOW DOSE TOXICOLOGICAL ESTIMATION**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 12500
 TASK CODE=V625F-47 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: DG HOEL US HEW
 MILESTONES...: 07/78 -SEMIANNUAL PROGRESS REPORT NATL INST OF HLTH /PHS
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-N-004207 SSIE-GMA 4761 EPA -D5-E772 TASK-V625F-47
 AP -625F DU -N140 LABT-EMI
 ABSTRACT.....: OBJECTIVE: TO DEVELOP STATISTICAL METHODS FOR ESTIMATING LOW-DOSE TOXIC EFFECTS BASED UPON HIGH-DOSE EXPERIMENTAL DATA. APPROACH: 1) EXAMINE EXISTING METHODS OF OBTAINING ADI VALUES. 2) STUDY VARIOUS STATISTICAL DOSE-RESPONSE MODELS FOR TOXICOLOGICAL EXTRAPOLATION. 3) DEVELOP STATISTICAL LOW-DOSE ESTIMATION AND APPLY THEM TO SAMPLE DATA. PRODUCT/RESULTS EXPECTED: NEW METHODOLOGIES FOR ESTIMATING LOW-DOSE TOXIC EFFECTS OF ENVIRONMENTAL AGENTS.

****PROJECT: 04208-STATISTICAL STUDIES OF PROBLEMS OF HEALTH AND BIOLOGY**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 81391
 TASK CODE=V625F-48 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: J NEYMAN UNIVERSITY OF CALIFORNIA
 L LECAM UNIVERSITY OF CALIFORNIA
 EL SCOTT UNIVERSITY OF CALIFORNIA
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-N-004208 SSIE-GMA 4768 EPA -D5-E772 TASK-V625F-48
 AP -625F DU -N140 LABT-EMI
 ABSTRACT.....: IT IS INTENDED TO WORK ON THE DEVELOPMENT OF STATISTICAL AND PROBABILISTIC SUBDISCIPLINES PARTICULARLY IMPORTANT IN THE STUDIES OF BIOLOGY AND HEALTH PROBLEMS. WHENEVER POSSIBLE, SUCH STUDIES WILL BE CONDUCTED IN CONJUNCTION WITH SUBSTANTIVE BIOLOGICAL STUDIES. TO FACILITATE THE ESTABLISHMENT OF THE RELEVANT CONTACTS, SEMINAR MEETINGS WITH SUBSTANTIVE SPEAKERS WILL BE USED, ONCE A WEEK DURING THE ACADEMIC YEAR AND MORE FREQUENTLY DURING SUMMER. MANY PROBLEMS CONTEMPLATED FOR THE IMMEDIATE FUTURE ARE SUGGESTED BY THE CURRENT ENERGY CRISIS. THE BROAD, SAY, ULTIMATE STATISTICAL PROBLEM CONNECTED WITH THIS CRISIS CAN BE STATED AS FOLLOWS: GIVEN THAT IN A LOCALITY A NEW ENERGY PRODUCING PLANT IS TO BE CONSTRUCTED, WITH A SPECIFIED ADDITIONAL ENVIRONMENTAL POLLUTION, TO ESTIMATE THE CONSEQUENT CHANGES IN THE SELECTED PARAMETERS OF PUBLIC HEALTH. IT IS PROPOSED TO STUDY A NUMBER OF SUBPROBLEMS OF THIS "ULTIMATE" PROBLEM. THESE INCLUDE: (1) THE USE OF MARKOV CHAINS TO STUDY "COMPETING RISKS", (2) METHODOLOGY OF TREATING FACTORIAL EXPERIMENTS, (3) CONSTRUCTION OF STOCHASTIC MODELS OF BIOLOGICAL PHENOMENA LIKE CARCINOGENESIS AND MUTAGENESIS. SOME RELEVANT MATHEMATICAL P

****PROJECT: 04209-THE INTERACTION OF CHEMICAL AGENTS PRESENT IN OIL SHALE WITH BIOLOGICAL SYSTEMS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 50957
 TASK CODE=V625F-49 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: CF CHIGNELL US HEW NATL INST OF HLTH /PHS
 MILESTONES.... 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-004209 SSIE-GMA 4762 EPA -D5-E772 TASK-V625F-49
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVE: THE OBJECTIVES OF THIS PROJECT ARE TO: (1) STUDY THE ROLE OF FREE RADICAL INTERMEDIATES FORMED DURING THE METABOLISM OF POLY NUCLEAR HYDROCARBONS IN THE TOXICITY OF THESE AGENTS, (2) TO STUDY THE MECHANISMS BY WHICH LIGHT (UV AND VISIBLE) SYNERGIZES THE TUMORIGENICITY OF POLYNUCLEAR HYDROCARBONS ON SKIN, AND (3) STUDY THE BINDING OF HEAVY METAL IONS TO PLASMA AND TISSUE PROTEINS ON THE BODY DISTRIBUTION OF THE METAL IONS. APPROACH: THE FORMATION AND CHARACTERIZATION OF FREE RADICAL INTERMEDIATES WILL BE DONE USING ELECTRON SPIN RESONANCE (ESR) SPECTROSCOPY. ESR SPECTROSCOPY CAN DETECT UNPAIRED ELECTRONS PRESENT BOTH IN FREE RADICALS (ORGANIC OR INORGANIC) AND IN PARAMAGNETIC METALS. IN SOME CASES, SPIN TRAPPING TECHNIQUES WILL BE USED TO TRANSFORM REACTIVE FREE RADICAL INTERMEDIATES TO FORM STABLE RADICALS WHICH CAN THEN BE IDENTIFIED. PRODUCT/RESULTS EXPECTED: (1) THE PROJECT WILL ATTEMPT TO DETECT AND QUANTIFY FREE RADICAL INTERMEDIATES OF POLYNUCLEAR HYDROCARBON METABOLISM, AND HOPEFULLY, PROVIDE INFORMATION ON THE MECHANISMS INVOLVED. (2) STUDIES ON THE BINDING OF METALS TO PROTEIN SHOULD PROVIDE INFORMATION ON THE NATURE OF THE FUNCTIONAL GROUPS TO WHICH THE METAL IS COORDINATED, AS WELL AS THE BINDING PARAMETERS FOR THE METAL-PROTEIN INTERACTIONS.

****PROJECT: 04210-THE EFFECT OF NOX AIR POLLUTANTS ON MEMBRANES**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 50000
 TASK CODE=V625F-51 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: CF CHIGNELL US HEW NATL INST OF HLTH /PHS
 MILESTONES.... 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-004210 SSIE-GMA 4763 EPA -D5-E772 TASK-V625F-51
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVE: THE OBJECTIVE OF THIS PROJECT IS TO EXAMINE THE EFFECTS OF NO2 ON MODEL MEMBRANES, E.G., LIPOSOMES, LECITHIN MULTILAYERS; BIOLOGICAL MEMBRANES, E.G., THOSE FROM ALVEOLAR MACROPHAGES OR ERYTHROCYTES; AND THE LUNG SURFACTANT LIPOPROTEIN. APPROACH: THE ELECTRON SPIN RESONANCE (ESR) SPECTROMETER WILL BE USED TO DETECT FREE RADICAL INTERMEDIATES FORMED AS A RESULT OF REACTIONS WITH NO2. IF SUCH INTERMEDIATES ARE NOT DETECTED, THE EFFECT OF NO2 ON MEMBRANE STRUCTURE WOULD BE ASCERTAINED WITH THE AID OF SPIN-LABELED ANALOGS OF STEROIDS, FATTY ACIDS AND PHOSPHOLIPIDS. PRODUCT/RESULTS EXPECTED: SEVERAL OF THE BIOCHEMICAL CHANGES FOUND IN LUNG FOLLOWING EXPOSURE TO NO2 MAY RESULT FROM LIPID PEROXIDATION. SINCE NO2 ITSELF IS PARAMAGNETIC AND HAS BEEN SHOWN TO PRODUCE FREE RADICAL INTERMEDIATES WHEN REACTED WITH UNSATURATED LIPIDS, WE WOULD EXPECT ESR SPECTROSCOPY SHOULD CONFIRM THIS EFFECT IN BIOLOGICAL MEMBRANES AND PROVIDE INFORMATION AS TO THE MECHANISM OF TOXICITY.

****PROJECT: 04212-CAN VITAMIN E OR LIPID ALTER NO2 OR O3 TOXICITY IN LUNG**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 59883
 TASK CODE=V625F-52 **EPA=D5-E772 ** (IAG) PRIOR FY /
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: DB MENZEL DUKE UNIV SCH OF ME/PHARM DEPT
 HO JAUREQUI DUKE UNIV SCH OF ME/PHARM DEPT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-004212 SSIE-GMA 4771 EPA -D5-E772 TASK-V625F-52
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... OZONE AND NITROGEN DIOXIDE MAY EXERT THEIR TOXIC EFFECTS BY PEROXIDATION OF THE UNSATURATED FATTY ACIDS OF THE LUNG AND OTHER TISSUES. TO TEST THIS HYPOTHESIS, MICE WILL BE FED CHEMICALLY DEFINED DIETS KNOWN TO PRODUCE LUNG LIPIDS HAVING DIFFERING DEGREES OF SUSCEPTIBILITY TO LIPID PEROXIDATION. DIETS WILL BE DEFICIENT OR SUFFICIENT IN VITAMIN E OR CONTAIN -TOCOPHERYL QUINONE OR PHENOLIC ANTIOXIDANTS. ANIMALS WILL BE EXPOSED TO OZONE AND NITROGEN DIOXIDE AND THE DOSE-RESPONSE RELATIONSHIP BETWEEN THE TOXICITY OF THESE AIR POLLUTANTS AND THE PEROXIDIZABILITY OF THE LUNG LIPIDS WILL BE DETERMINED. THE PROTECTIVE EFFECT OF VITAMIN E AND OTHER PHENOLIC ANTIOXIDANTS WILL BE DETERMINED. THE EFFECTS OF AIR POLLUTANT EXPOSURE WILL ALSO BE MEASURED BY CHANGES IN GROWTH AND IN LUNG LIPID COMPOSITION AND ENZYME CONTENT. POTENTIAL DEFENSE MECHANISMS OF PEROXIDASES WILL BE INVESTIGATED IN BOTH LUNG AND LIVER. THE TOXIC EFFECTS OF OZONE AND NITROGEN DIOXIDE WILL BE COMPARED WITH PUTATIVE CHEMICAL INTERMEDIARIES OF TOXICITY. THESE STUDIES ARE DESIGNED TO TEST THE FREE RADICAL THEORY OF ACTION OF THESE AIR POLLUTANTS, AND TO DETERMINE THE DIETARY LEVELS OF ANTIOXIDANTS NECESSARY TO PREVENT LUNG DAMAGE AT CURRENT CONCENTRATIONS OF AIR POLLUTION.

****PROJECT: 04213-PULMONARY EFFECTS OF ENVIRONMENTAL OXIDANT POLLUTANTS**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 315170
 TASK CODE=V625F-53 **EPA=D5-E772 ** (IAG) PRIOR FY /

EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: DL DUNGWORTH UNIVERSITY OF CALIFORNIA
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-004213 SSIE-GMA 4764 EPA -D5-E772 TASK-V625F-53
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... RATS AND MONKEYS WILL BE CHRONICALLY EXPOSED TO OXIDANT AIR POLLUTANTS, PRIMARILY OZONE, AT CONCENTRATIONS APPROXIMATING HIGH AMBIENT LEVELS (0.2-0.5 PPM). A MULTIDISCIPLINARY GROUP WILL MAKE INTEGRATED BIOCHEMICAL, MICROBIOLOGICAL, PHYSIOLOGICAL AND MORPHOLOGICAL EVALUATIONS OF EFFECTS. THE FINDINGS WILL HAVE RELEVANCE TO THE SPECIFIC PROBLEM OF AIR POLLUTION AND TO A GENERAL UNDERSTANDING OF PULMONARY PATHOBIOLOGY. BY PLOTTING THE RELATIVE LEVELS OF SENSITIVITY OF THE VARIOUS PARAMETERS STUDIED AND THE EFFECTS OBSERVED, A BASIS WILL BE PROVIDED FOR MAKING PREDICTIONS OF POSSIBLE LONG-TERM CONSEQUENCES OF PHOTOCHEMICAL SMOG ON MAN. COMPARISON OF EFFECTS IN RATS AND MONKEYS SHOULD PROVIDE FOR MORE CONFIDENT EXTRAPOLATION TO MAN AND HENCE ENABLE THE SETTING OF RATIONAL AIR QUALITY CRITERIA. A PRIMARY GOAL IS TO TEST CRITICAL HYPOTHESES CONCERNING BIOCHEMICAL, IMMUNOLOGICAL AND CELLULAR MECHANISMS RESPONSIBLE FOR THE DELETERIOUS EFFECTS OF THE POLLUTANTS. MAJOR PATHOGENETIC AND MODIFYING FACTORS OF INTEREST ARE: THE ROLE OF LIPID PEROXIDATION IN INITIATING DAMAGE; THE INDUCTION OF ANTIOXIDANT DEFENSE MECHANISMS BY CONTINUED EXPOSURE AND THE GENERAL PHENOMENON OF ADAPTATION; THE SITES OF IMPAIRMENT IN PULMONARY ALVEOLAR MACROPHAGES AND COMPONENTS OF THE IMMUNE SYSTEM IN THE LUNG; THE SEQUENCE AND NATURE OF LESIONS RESULTING IN THE DEVELOPMENT OF CHRONIC OBSTRUCTIVE LUNG DISEASE (BRONCHITIS/EMPHYSEMA) AND INTERSTITIAL FIBROSIS. AN ADDITIONAL GOAL IS TO EXPLORE FURTHER THE POTENTIAL PROPHYLACTIC VALUE FOR HUMAN POPULATIONS OF DIETARY ANTIOXIDANTS SUCH AS V

****PROJECT: 04214-ENVIRONMENTAL CELLULAR TOXICOLOGY PROGRAM**

STARTING/ COMPLETION DATE : 00/77 - UNK : FUNDING : ESTIMATED - FY77 / \$ 48000
 TASK CODE=V625F-54 **EPA=D5-E772 ** (IAG) PRIOR FY /

EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: DG WENZEL UNIVERSITY OF KANSAS
 CK ERICKSON UNIVERSITY OF KANSAS
 H RYTTING UNIVERSITY OF KANSAS

MILESTONES...: 07/78 -SEMIANNUAL PROGRESS REPORT
 01/79 -ANNUAL PROGRESS REPORT

PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-004214 SSIE-GMA 4770 EPA -D5-E772 TASK-V625F-54
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... THIS IS A REQUEST FOR AN ENVIRONMENTAL CELLULAR TOXICOLOGY PROGRAM AT THE UNIVERSITY OF KANSAS. THE MISSION OF THE UNIT WILL BE TO INITIATE, COORDINATE AND TO FACILITATE RESEARCH OF INVESTIGATORS IN THE AREA OF THE TOXICOLOGY OF ENVIRONMENTAL TOXICANTS AT THE CELLULAR LEVEL. THE EMPHASIS IS TO BE ON THE MEASUREMENT OF A VARIETY OF TOXICANT-INDUCED ALTERATIONS OF CULTURED OR ISOLATED CELLS AS EARLY INDICES OF INJURY. THE THRUST OF THIS APPROACH WILL BE TO ESTABLISH QUANTITATIVE METHODOLOGIES THAT RELATE TO MECHANISMS OF TOXICITY. CELL MODELS ARE TO INCLUDE: BLOOD PLATELETS, CULTURED NERVE, HEART MUSCLE AND ENDOTHELIAL CELLS, AND LUNG FIBROBLASTS AND MACROPHAGES. METHODS OF EVALUATION ARE TO INCLUDE, BUT NOT BE LIMITED TO, CHANGES IN: VIABILITY, MORPHOLOGY, PLASMA AND ORGANELLE MEMBRANE CHARACTERISTICS, LOCOMOTION, AND BIOCHEMICAL CONSTITUENTS, ESPECIALLY NEUROTRANSMITTERS. THE PROGRAM WILL BE HOUSED PRIMARILY IN THE DEPARTMENT OF PHARMACOLOGY AND TOXICOLOGY BUT IT IS TO INCLUDE INDIVIDUAL INVESTIGATORS (PRESENT AND FUTURE) FROM OTHER DEPARTMENTS. TO BE COORDINATED WITH THE PROGRAM IS A TRAINING FUNCTION DIRECTED TOWARD GRADUATE EDUCATION OF STUDENTS IN THE DISCIPLINE OF CELLULAR TOXICOLOGY. BECAUSE OF THE DEPARTMENT OF PHARMACOLOGY AND TOXICOLOGY IS INTEGRATED WITH THE DEPARTMENTS OF MEDICINAL CHEMISTRY AND PHARMACEUTICAL CHEMISTRY IN THE SCHOOL OF PHARMACY, AND SHARES THE USE OF MAJOR EQUIPMENT WITH THE CHEMISTRY DEPARTMENT AND OTHERS, THE RESOURCES OF THESE OTHER DEPARTMENTS ARE ALSO AVAILABLE TO SOLVE PROBLEMS RELATED TO THE RESEARCH PROGRAM AS SET FORTH AND TO GRADUATE STUDENT EDUCATION IN CELLULAR TOXICOLOGY.

****PROJECT: 04216-PRENATAL DOSIMETRY - POLLUTANT METALS**

STARTING/ COMPLETION DATE : 06/75 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=V625F-55 **EPA=D6-E681-AQ ** (IAG) PRIOR FY76 / \$ 180000

EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: PL HACKETT BATTELLE MEMORIAL INST
 MR SIKOV BATTELLE MEMORIAL INST
 DD MAHLUM BATTELLE MEMORIAL INST

MILESTONES...: 07/78 -SEMI-ANNUAL PROGRESS REPORT

PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... RECN-004216 SSIE-GMA 5361 EPA -D6-E681-AQ TASK-V625F-55
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... THIS PROJECT IS CONCERNED WITH CERTAIN HEAVY METALS ASSOCIATED WITH ENERGY PRODUCTION, FOR WHICH THERE IS DIRECT OR INFERENTIAL EVIDENCE FOR DELETERIOUS EFFECTS ON PRENATAL DEVELOPMENT. IT WILL DEFINE THE SPECIFIC INFLUENCES OF FACTORS WHICH AFFECT THE QUALITATIVE AND QUANTITATIVE ASPECTS OF THE CROSS-PLACENTAL TRANSFER AND DISTRIBUTION OF THESE METALS IN THE FETOPLACENTAL UNIT. INTRAVENOUS, ORAL AND INHALATION ROUTES OF ADMINISTRATION WILL PROVIDE DIFFERENCES IN THE RATE AND POSSIBLY, THE CHEMICAL FORM IN WHICH THE METALS ARE PRESENTED TO THE PLACENTA. THE INITIAL STUDIES INVOLVING LEAD EXPOSURES AT REPRESENTATIVE GESTATIONAL AGES HAVE DETERMINED MASS EFFECTS ON METABOLISM USING TRACER 210PB ADMINISTERED CONCOMITANTLY WITH VARIOUS LEVELS OF STABLE PB (NO3)2. A RAPID UPTAKE INTO THE FETOPLACENTAL UNIT WAS OBSERVED FOLLOWING INTRAVENOUS ADMINISTRATION OF 0.5 AND 25 MG PB (NO3)2/KG TO RATS; THE HIGHEST DOSE WAS EMBRYOTOKIC AND TERATOGENIC. THE PERCENTAGES OF THE LEAD DOSE ABSORBED BY THE DAM FOLLOWING INHALATION OR ORAL EXPOSURES WERE DOSE DEPENDENT BUT THE KINETICS WERE SIMILAR TO THOSE FOLLOWING INTRAVENOUS ADMINISTRATION. CURRENT STUDIES ARE INVESTIGATING TRANSFER AND DISTRIBUTION OF ARSENIC, CADMIUM AND SELENIUM WHICH HAVE BEEN SHOWN TO BE EMBRYOCIDAL AND/OR TERATOGENIC, AS WELL AS NICKEL, WHICH HAS YIELDED EQUIVOCAL RESULTS, AND VANADIUM, WHICH APPARENTLY HAS NOT BEEN EVALUATED.

****PROJECT: 04218-GENETIC EFFECTS FROM ELECTRIC FIELDS AT THE CHROMOSOMAL LEVEL OF DROSOPHILA**

STARTING/ COMPLETION DATE : 06/75 - 05/78 : FUNDING : ESTIMATED - FY77 / \$ 90000
 TASK CODE=V625F-56 **EPA-D8-E681-AN ** (IAG) PRIOR FY76 / \$ 157000
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: FP HUNGATE BATTELLE MEMORIAL INST
 RL RICHARDSON BATTELLE MEMORIAL INST

MILESTONES....: 02/78 -FINAL REPORT
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-004218 SSIE-GMA 5362 EPA -D8-E681-AN TASK-V625F-56
 AP -625F DU -N140 LABT-EMI

ABSTRACT.....: OBJECTIVES: THIS WORK SEEKS TO IDENTIFY THE POTENTIAL FOR CHANGE IN THE GENETIC MATERIAL FOLLOWING EXPOSURE TO LARGE DC AND AC ELECTRIC FIELDS. APPROACH: SMALL ORGANISMS OR CELL SYSTEMS ARE EXPOSED TO UNIFORM AND WELL CHARACTERIZED ELECTRIC FIELDS AND SUBSEQUENTLY ANALYZED FOR THE PRESENCE OF GENETIC CHANGE. PROGRESS: BACTERIAL CULTURES WERE EXPOSED ABOUT 18 HOURS TO DC FIELDS OF 200 TO 800 KV/M AND THE FREQUENCY OF MUTANTS EVALUATED BY PLATING ON MEDIA RESTRICTING GROWTH OF NON-MUTATED CELLS. PRELIMINARY DATA INDICATES A SIGNIFICANT INCREASE IN THE FREQUENCY OF MUTANTS IN SALMONELLA (AMES STRAIN TA-100). A SIMILARLY SIGNIFICANT INCREASE IS ALSO OBSERVED IN PHOTOBACTERIUM FISHERI EXPOSED TO THESE HIGH FIELDS. NO SIGNIFICANT EFFECT ON MUTATION FREQUENCY WAS OBSERVED IN THE AMES STRAIN TA-98. INITIAL DATA FROM DROSOPHILA EXPOSED AS PUPAE FOR 3 DAYS TO A 185 KV/M DC FIELD SUGGESTS AN INCREASE IN FREQUENCY OF SEX LINKED LETHALS, SHOWN BY THE MULLER-B TEST, IN PROGENY OF EXPOSED MALES. ANALYSES OF OZONE IN THE EXPOSURE CHAMBER AIR INDICATE THAT THIS IS NOT RESPONSIBLE FOR THE OBSERVED INCREASED MUTATION FREQUENCY.

****PROJECT: 04219-USE OF MOUSE SPECIFIC-LOCUS METHOD TO QUANTIFY THE GENE MUTATION HAZARD**

STARTING/ COMPLETION DATE : 01/76 - 01/81 : FUNDING : ESTIMATED - FY77 / \$ 175000
 TASK CODE=V625F-57 **EPA-D5-E681-AQ ** (IAG) PRIOR FY76 / \$ 394000
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: LB RUSSELL U.S. DEPT. OF ENERGY
 WL RUSSELL U.S. DEPT. OF ENERGY

MILESTONES....: 07/77 -SEMI-ANNUAL PROGRESS REPORT
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-004219 SSIE-GMA 5351 EPA -D5-E681-AQ TASK-V625F-57
 AP -625F DU -N140 LABT-EMI

ABSTRACT.....: THERE ARE TWO IMPORTANT ASPECTS TO QUANTIFICATION OF MUTAGENESIS IN MAMMALIAN SYSTEMS THAT SCORE TRANSMITTED MUTATIONS. FIRST, FOR COMPOUNDS THAT ARE CLEARLY MUTAGENIC IT IS IMPORTANT TO BE ABLE TO EVALUATE WHAT THE MUTATION FREQUENCY WOULD BE AT EXPOSURE LEVELS LIKELY TO BE EXPERIENCED BY THE HUMAN POPULATION. SOME CHEMICALS HAVE ALREADY SHOWN A DOSE-RESPONSE CURVE MUCH STEEPER THAN LINEAR, AND THE POSSIBILITY OF A THRESHOLD DOSE LEVEL EXISTS. SECOND, FOR CHEMICALS THAT SHOW NO MUTAGENICITY IN THE SAMPLE OF ANIMALS EXAMINED IN A MAMMALIAN TEST SYSTEM, IT IS IMPORTANT TO HAVE THE SAMPLE SIZE ADEQUATE TO JUSTIFY A QUANTIFIED STATEMENT THAT THE OBSERVED ZERO MUTATION RATE EXCLUDES, WITH HIGH CONFIDENCE, THE POSSIBILITY THAT ANY MUTAGENICITY OF THE COMPOUND COULD BE HIGHER THAN A CERTAIN LOW, ACCEPTABLE LEVEL. WE ARE USING THE SPECIFIC-LOCUS METHOD IN MICE - THE ONLY RELIABLE AND DEFINITIVE TEST FOR TRANSMITTED GENE MUTATIONS CURRENTLY AVAILABLE IN MAMMALS, TO QUANTIFY THE EFFECTS OF COAL-TECHNOLOGY-RELATED COMPOUNDS. PROBABLY POSITIVE SUBSTANCES ARE IDENTIFIED FOR THIS PURPOSE IN A SEPARATE SCREENING PROJECT, OR ARE SELECTED BECAUSE OF THE POTENTIAL WIDESPREAD EXPOSURE OF HUMAN POPULATIONS. EXTENSIVE TESTS WITH THE S02 METABOLITE SODIUM BISULFITE PROVED NEGATIVE. WE ARE NOW ENGAGED IN THE TESTING OF BENZO(A)PYRENE (BP). TO DATE, TWO MUTATIONS WERE FOUND IN ABOUT 26,000 OFFSPRING FROM TREATED SPERMATOGONIA - NOT SIGNIFICANTLY ABOVE CONTROL VALUE. IT APPEARS THAT BP, FOR WHICH WE HAVE SHOWN POSITIVE EFFECTS IN CHROMOSOME-DAMAGE TESTS, IS NOT A POINT MUTATION INDUCER IN MALE GERM CELLS. TESTS ARE UNDERWAY NOW IN FEMALES.

****PROJECT: 04221-SCREENING FOR THE MUTAGENICITY AND CARCINOGENICITY OF ENERGY RELATED POLLUTANTS**

STARTING/ COMPLETION DATE : 01/76 - 01/81 : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=V625F-58 **EPA-D5-E681-AQ ** (IAG) PRIOR FY76 / \$ 180000
 EPA OFFICER.: G RAUSA EPA/HDQTRS- OEMI
 INVESTIGATOR.: AW HSIE U.S. DEPT. OF ENERGY
 DB COUCH U.S. DEPT. OF ENERGY
 PA BRIMER U.S. DEPT. OF ENERGY

MILESTONES....: 07/78 -SEMI-ANNUAL PROGRESS REPORT
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-004221 SSIE-GMA 5355 EPA -D5-E681-AQ TASK-V625F-58
 AP -625F DU -N140 LABT-EMI

ABSTRACT.....: OUR GOAL IS TO EMPLOY MAMMALIAN CELL CULTURE SYSTEMS TO STUDY THE GENETIC TOXICITY OF ENVIRONMENTAL AGENTS RELATED TO FOSSIL FUEL ENERGY TECHNOLOGIES. WE HAVE EMPLOYED THE CHINESE HAMSTER OVARY CELLS/HYPOXANTHINE-GUANINE PHOSPHORIBOSYL TRANSFERASE (CHO/HGPRT) SYSTEM COUPLED WITH MICROSOE ACTIVATION TO STUDY THE CYTOTOXICITY AND MUTAGENICITY OF ENVIRONMENTAL POLLUTANTS IDENTIFIABLE CHEMICALLY OR FUEL SUBFRACTIONS SEPARATED ANALYTICALLY. WE FOUND THAT MNCL2, FES04 AND COCL2 ARE MUTAGENIC; N1CL2, BES04 AND COCL2 ARE WEAKLY MUTAGENIC. THE EFFECTS OF MNCL2 WERE ABOLISHED BY THE EXCESS OF MGCL2. THE UNUSUAL ENVIRONMENT REQUIRED FOR DEMONSTRATION OF MUTAGENICITY OF MNCL2 MAY ACCOUNT IN PART FOR THE VARYING RESULTS OBTAINED WITH PB (CH3COO)2, RBCL, H2SE03 AND TICL4. POLYCYCLIC HYDROCARBONS BENZO(A)PYRENE (B(A)) BENZ(A)ANTHRACENE (BA) AND 7,12-DIMETHYL BA ARE MUTAGENIC; WEAK CARCINOGEN BENZO (E) PYRENE IS LESS MUTAGENIC THAN B (A) P; AND NON-CARCINOGENS PYRENE AND ANTHRACENE ARE NONMUTAGENIC. MOST PHENOLS ARE CYTOTOXIC, BUT NOT MUTAGENIC. B(A)P-4,5-EPOXIDE AND B(A)P-7,8-DIOL,9-10-EPOXIDE(SYN) APPEAR TO BE THE ULTIMATE MUTAGENS OF B(A)P. QUINOLINE IS MUTAGENIC. FOUR-NITROQUINOLINE-1-OXIDE, IS HIGHLY MUTAGENIC; ITS MUTAGENICITY DECREASES WHEN ASSAYED WITH THE ACTIVATION SYSTEM. EIGHT-HYDROXY-, 8-AMINO-, 8-NITRO-QUINOLINE EXHIBIT VARIABLY WEAK MUTAGENICITY. THE ACETONE EFFLUENT (WHICH CONTAINS HETEROCYCLIC NITROGEN COMPOUNDS) DERIVED FROM THE BASIC FRACTION OF A CRUDE SYNTHETIC FUEL IS MOST MUTAGENIC. THUS, THE CHO/HGPRT ASSAY IS APPLICABLE FOR THE SCREENING OF THE GENETIC TOXICITY OF BOTH INDIVIDUAL CHEMICALS AND ORGANIC MIXTURES. WE EXPECT TO COMPLETE PRELIMINARY STUDIES SUCH AS THOSE ON METALLIC COMPOUNDS AND SUBFRACTIONED SYNTHETIC FUELS, AND THEN TO EXTEND THE STUDY TO OTHER MAJOR ENVIRONMENTAL CHEMICAL GROUPS. WITH SOME EXPANSION OF SUPPORT, WE PROPOSE TO EXPAND THE CHO/HGPRT ASSAY TO ADDITIONAL STUDIES ON CHROMOSOME ABERRATIONS AND SISTER CHROMATID EXCHANGES. OUR PRELIMINARY STUDIES SHOW THAT IT IS FEASIBLE TO DETERMINE S

****PROJECT: 04223-TERATOGENIC AND MUTAGENIC EFFECTS OF TRACE METALS AND CARCINOGENIC HYDROCARBONS ON CULTURED MAMMALIAN CELLS**

STARTING/ COMPLETION DATE : 07/75 - 09/80 : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=V625F-59 **EPA-D5-E681-AD ** (IAG) PRIOR FY76 / \$ 225000

EPA OFFICER.: G RAUSA
 INVESTIGATOR.: J DEVELLIS
 L GERSCHENSON
 I HARARY
 K MCCARTHY
 H HERSCHMAN

EPA/HOQTRS- DEMI
 UNIVERSITY OF CALIFORNIA
 UNIVERSITY OF CALIFORNIA
 UNIVERSITY OF CALIFORNIA
 UNIVERSITY OF CALIFORNIA
 UNIVERSITY OF CALIFORNIA

MILESTONES...: 07/78 -SEMI-ANNUAL PROGRESS REPORT
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-004223 SSIE-GMA 5352 EPA -D5-E681-AD TASK-V625F-59
 AP -625F DU -N140 LABT-EMI

ABSTRACT.....: THE AIM OF THIS PROJECT IS TO VALIDATE THE USE OF CELL CULTURES FROM NERVOUS TISSUE, LIVER AND MUSCLE AS FAST, EASY, QUANTITATIVE AND RELIABLE TEST SYSTEMS TO EVALUATE THE POTENTIAL TERATOGENIC AND METAGENIC EFFECTS OF TRACE HEAVY METALS AND CARCINOGENIC HYDROCARBONS RELEASED DURING THE COMBUSTION OF FOSSIL FUELS. WE ARE SPECIFICALLY STUDYING: A) THE EFFECT OF LEAD AND CADMIUM ON THE GENERAL GROWTH PARAMETERS OF SEVERAL CELL TYPES. B) THE EFFECT OF LEAD AND CADMIUM ON THE DEVELOPMENTAL EXPRESSION OF DIFFERENTIATED FUNCTIONS IN LIVER, BRAIN AND MUSCLE CELL CULTURES. C) THE INDUCTION OF CADMIUM BINDING PROTEIN (METALLOTHIONEIN) IN CULTURED LIVER CELLS. D) THE ESTABLISHMENT OF LEAD AND CADMIUM RESISTANT CELL LINES AND THE MECHANISM FOR THIS RESISTANCE. A THREE-YEAR REPORT (1975-1978) WILL BE SUBMITTED TO EPA IN JUNE 1978. THE EXPRESSION OF REGULATED TISSUE-SPECIFIC FUNCTIONS WAS DIFFERENTIALLY AFFECTED BY LEAD IN VARIOUS CELL TYPES. FOR SEVERAL FUNCTIONS, THE EFFECT OF LEAD WAS STUDIED IN THE ANIMAL, AND THE RESULTS OBTAINED WERE COMPARED TO THE DATA DERIVED FROM CELL CULTURES. THERE WAS CLOSE AGREEMENT BETWEEN THE ANIMAL AND CELL CULTURE DATA, THUS VALIDATING THE USE OF CELL CULTURE AS TEST SYSTEMS. LEAD-RESISTANT CELL LINES WERE DEVELOPED FROM LIVER AND BRAIN CELL LINES. THE RESISTANCE TO LEAD WAS FOUND TO BE HEREDITARY AND STABLE. THERE WAS NO CROSS RESISTANCE IN THE LEAD RESISTANT CELL LINES FOR CADMIUM OR COBALT. WE HAVE DEFINED A CLONAL CELL SYSTEM WHICH ACCUMULATES METALLOTHIONEIN (MT) IN CULTURE IN RESPONSE TO CADMIUM OR ZINC EXPOSURE. THE INCORPORATION OF LABELLED AMINO ACIDS INTO MT WAS STUDIED IN RESPONSE TO ACUTE EXPOSURE TO A HEAVY METAL. MT IN CELL CULTURES APPEARS IDENTICAL TO MT ISOLATED FROM

****PROJECT: 04226-DEVELOPMENT AND USE OF DIFFERENTIATED CELL CULTURES FOR TOXICOLOGY STUDIES**

STARTING/ COMPLETION DATE : 07/75 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 100000
 TASK CODE=V625F-61 **EPA-D5-E-681-AD ** (IAG) PRIOR FY76 / \$ 225000

EPA OFFICER.: G RAUSA
 INVESTIGATOR.: LE GERSCHENSON
 J DEVELLIS
 I HARARY
 H HERSCHMAN

EPA/HOQTRS- DEMI
 UNIVERSITY OF CALIFORNIA
 UNIVERSITY OF CALIFORNIA
 UNIVERSITY OF CALIFORNIA
 UNIVERSITY OF CALIFORNIA

MILESTONES...: 07/78 -FINAL REPORT
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-004226 SSIE-GMA 5357 EPA -D5-E-681-AD TASK-V625F-61
 AP -625F DU -N140 LABT-EMI

ABSTRACT.....: THE OVERALL OBJECTIVE OF THIS PROJECT IS TO STUDY THE POSSIBLE HORMONAL REGULATION OF THE EFFECT OF CHEMICAL CARCINOGENS ON CULTURED ENDOMETRIAL CELLS. THIS MODEL HAS BEEN SHOWN TO BE RESPONSIVE TO THE "IN VITRO" ADDITION OF ESTROGENS AND PROGESTINS. SINCE ESTROGENS HAVE BEEN FOUND TO HAVE A "PROMOTING" ROLE FOR ENDOMETRIAL ADENOCARCINOMA, WHILE PROGESTERONE IS USED FOR ITS TREATMENT, IT APPEARED REASONABLE TO EXPLORE THIS AVENUE OF RESEARCH. WE HAVE FOUND BEFORE THAT PROGESTERONE HAD A PROTECTIVE EFFECT UPON THE CYTOTOXICITY DISPLAYED BY THE CHEMICAL CARCINOGEN DMBA WHEN BOTH AGENTS ARE ADDED TOGETHER. HOWEVER, WHEN THE CELLS WERE PRE-INCUBATED FOR 24 HRS. WITH THE STEROID HORMONE, BEFORE THE ADDITION OF DMBA, THE CYTOTOXIC EFFECT WAS HIGHER. OUR INTERPRETATION OF THIS STATE IS THAT PROGESTERONE HAS A DUAL EFFECT: IT CAN COMPETE WITH DMBA WHEN ADDED SIMULTANEOUSLY. HOWEVER, WHEN ADDED ALONE IT ACTS AS AN INDUCER, INCREASING THE AMOUNT OF DMBA-ACTIVATING ENZYMES. TO TEST THESE ASSUMPTIONS, WE ARE GOING TO MEASURE THE EFFECT OF PROGESTERONE ON ARYL-HYDROCARBON HYDROXYLASE (9/78 PUBLISH ANNUAL REPORT).

****PROJECT: 04228-IN VIVO SCREENING FOR GENE MUTATIONS IN MOUSE GERM AND SOMATIC CELLS**

STARTING/ COMPLETION DATE : 01/76 - 01/81 : FUNDING : ESTIMATED - FY77 / \$ 175000
 TASK CODE=V625F-62 **EPA-D5-E681-AN ** (IAG) PRIOR FY76 / \$ 394000

EPA OFFICER.: G RAUSA
 INVESTIGATOR.: LB RUSSELL
 WL RUSSELL

EPA/HOQTRS- DEMI
 U.S. DEPT. OF ENERGY
 U.S. DEPT. OF ENERGY

MILESTONES...: 02/78 -SEMI-ANNUAL PROGRESS REPORTS
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: REC-004228 SSIE-GMA 5350 EPA -D5-E681-AN TASK-V625F-62
 AP -625F DU -N140 LABT-EMI

ABSTRACT.....: SINCE THERE IS INCREASING EVIDENCE THAT TESTS WITH LOWER ORGANISMS ARE NOT NECESSARILY PREDICTIVE OF MUTAGENICITY OF CHEMICALS IN THE WHOLE MAMMAL, WE ARE USING IN VIVO MOUSE SYSTEMS TO SCREEN FOR POSSIBLE MUTAGENIC EFFECTS OF COMPOUNDS AND MIXTURES ASSOCIATED WITH COAL TECHNOLOGIES. A SOMATIC MUTATION SYSTEM ("SPOT TEST") WAS DEVELOPED BY US, AND, IN A TEST WITH SEVERAL CHEMICALS, HAS BEEN VALIDATED AS A USEFUL PRESCREEN FOR INDUCED GERMLINE MUTATIONS. THIS METHOD USES RELATIVELY SMALL NUMBERS OF ANIMALS, AND A TEST CAN BE COMPLETED IN FIVE WEEKS. HOWEVER, SINCE THE METHOD DETECTS VARIOUS CHROMOSOMAL CHANGES, IN ADDITION TO POINT MUTATIONS, IT IS NOT, BY ITSELF, A DEFINITIVE TEST FOR THE LATTER. WE THEREFORE ALSO USE THE SPECIFIC-LOCUS METHOD, THE ONLY RELIABLE AND DEFINITIVE TEST FOR TRANSMITTED GENE MUTATIONS AND SMALL DEFICIENCIES CURRENTLY AVAILABLE IN MAMMALS. THIS METHOD HAS BEEN EXTENSIVELY EMPLOYED BY US IN RADIATION WORK AND HAS ALREADY PROVED ITS USEFULNESS IN CHEMICAL MUTAGENESIS STUDIES. TO MAKE THE METHOD ECONOMICALLY EFFICIENT FOR SCREENING PURPOSES, IT IS BEING USED IN THIS PROJECT FOR WHOLE MIXTURES AS WELL AS MODEL COMPOUNDS. THE "SPOT TEST" HAS GIVEN POSITIVE RESULTS FOR BENZO(A)PYRENE. EARLY RESULTS FROM THE COAL-CONVERSION PRODUCT SYNTHOIL CRUDE HAVE BEEN WEAKLY POSITIVE. IN THE SPECIFIC-LOCUS SCREENING, TESTING IS CURRENTLY UNDERWAY WITH THE SYNTHOIL CRUDE MIXTURE, APPLIED IN SINGLE OR REPEATED DOSES TO DATE, NO MUTATIONS HAVE BEEN OBSERVED IN OVER 12,000 OFFSPRING OF TREATED MALES.

****PROJECT: 04232-"IN-VITRO" CHEMICAL CARCINOGENESIS OF HORMONE-RESPONSIVE CULTURED ENDOMETRIAL CELLS**

STARTING/ COMPLETION DATE : 07/75 - 09/78 : FUNDING : ESTIMATED - FY77 / \$ 30000
 TASK CODE=V625F-65 **EPA-D5-E681-AN ** (IAG) PRIOR FY76 / \$ 67000
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: LE GERSCHENSON UNIVERSITY OF CALIFORNIA
 MILESTONES.... 07/78 -TERMINAL REPORT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-004232 SSIE-GMA 5358 EPA -D5-E681-AN TASK-V625F-65
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... THE AIM OF THIS PROJECT IS TO STUDY THE MOLECULAR MECHANISM(S) OF HEAVY METALS TOXICITY IN DIFFERENTIATED LIVER, MUSCLE AND BRAIN PERMANENT CELL LINES. FOR THIS PURPOSE THE EFFECT OF LEAD UPON THE HEME PATHWAY AND THE ORGAN-SPECIFIC FUNCTION OF THE CELL LINES IS UNDER INVESTIGATION. WE PROPOSE TO VALIDATE THESE "IN VITRO" MODELS AS RAPID, SIMPLE AND RELIABLE SYSTEMS TO SCREEN FOR ENERGY-RELATED POLLUTANTS. WE HAVE STUDIED THE EFFECT OF LEAD ON CULTURED CELL PROLIFERATION, HEME SYNTHESIS AND DIFFERENTIATED FUNCTIONS OF CULTURED LIVER, GLIAL, NEURONAL AND MUSCLE CELLS. WE HAVE ALSO ISOLATED SEVERAL LEAD-RESISTANT CELL LINES. WE WILL NOW STUDY THE DIFFERENTIATED FUNCTIONS OF LEAD-RESISTANT VS. LEAD-SENSITIVE CELL LINES AS WELL AS THE EFFECTS OF THE HEAVY METAL ON THE DEVELOPMENT OF MUSCLE DEVELOPMENT (9/78 PUBLISH ANNUAL REPORT).

****PROJECT: 04234-CHEMICAL INDUCTION OF CHROMOSOMAL ABERRATIONS IN MOUSE GERM CELLS**

STARTING/ COMPLETION DATE : 07/76 - 07/81 : FUNDING : ESTIMATED - FY77 / \$ 53000
 TASK CODE=V625F-66 **EPA-D5-E681-AN ** (IAG) PRIOR FY76 / \$ 91000
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: WM GENEROSO U.S. DEPT. OF ENERGY
 MILESTONES.... 02/78 -SEMI ANNUAL PROGRESS REPORTS
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-004234 SSIE-GMA 5353 EPA -D5-E681-AN TASK-V625F-66
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... A STUDY ON THE EFFECTIVENESS OF SYNTHOIL PRODUCT OIL (SYNCRUDE) AND ITS COMPONENTS (BASIC, ACID, AND NEUTRAL FRACTIONS) TO INDUCE CHROMOSOMAL ABERRATION AND CYTOTOXIC EFFECTS IN MICE GERM CELLS HAS BEEN UNDERWAY. THREE TEST SYSTEMS ARE CURRENTLY USED - DOMINANT LETHAL, HERITABLE TRANSLOCATION, AND TOTAL REPRODUCTIVE CAPACITY TESTS. RESULTS TO DATE INDICATE THAT SYNCRUDE INDUCED LOW LEVELS OF DOMINANT-LETHAL MUTATIONS IN SPERMATOZOA. WE HAVE STARTED AN EXPERIMENT TO SEE IF THE CHROMOSOME DAMAGE THAT LED TO DOMINANT LETHALITY IS ASSOCIATED WITH THE PRODUCTION OF HERITABLE TRANSLOCATIONS. A STUDY TO FIND OUT WHICH OF THE THREE FRACTIONS CONTAIN DOMINANT-LETHAL ACTIVITY IS ALSO UNDERWAY.

****PROJECT: 04238-MUTAGENICITY ASSAY OF FRACTIONATED COAL-CONVERSION PRODUCTS**

STARTING/ COMPLETION DATE : 01/76 - 01/81 : FUNDING : ESTIMATED - FY77 / \$ 125000
 TASK CODE=V625F-67 **EPA-D5-E681-AN ** (IAG) PRIOR FY76 / \$ 281000
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: JL EPLER U.S. DEPT. OF ENERGY
 MILESTONES.... 02/78 -SEMI-ANNUAL PROGRESS REPORTS
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-004236 SSIE-GMA 5356 EPA -D5-E681-AN TASK-V625F-67
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... SHORT-TERM MUTAGENICITY TESTS, INCLUDING BACTERIAL, FUNGAL, INSECT, AND MAMMALIAN CELL SYSTEMS, HAVE BEEN APPLIED IN A COMPARATIVE SENSE TO EXEMPLARY TEST MATERIALS FROM SYNTHETIC FUEL TECHNOLOGIES. THE SALMONELLA HISTIDINE REVERSION ASSAY (AMES' TEST) HAS BEEN SHOWN TO BE GENERALLY APPLICABLE ESPECIALLY WHEN UTILIZED WITH CHEMICALLY FRACTIONATED MATERIALS. LIQUID-LIQUID EXTRACTION AND COLUMN CHROMATOGRAPHY ARE USED TO SEPARATE CRUDE TEST MATERIALS INTO DEFINED FRACTIONS FOR BIOASSAY PARALLELED BY CHEMICAL ANALYSES. TEST MATERIALS HAVE INCLUDED VARIOUS CRUDE OILS AND PRODUCT WATERS ALONG WITH EXTRACTS FROM RAW SHALE AND PROCESSED SHALE. MUTAGENIC MATERIALS HAVE BEEN OBSERVED IN THE BASIC AND NEUTRAL (POLYCYCLIC AROMATIC HYDROCARBON) FRACTIONS. EXTRAPOLATIONS TO SPECIFIC COMPOUNDS AND TO THE OVERALL BIO-HAZARD OF THE TEST MATERIALS ARE IN PROGRESS. COMPARATIVE STUDIES WITH SAMPLES FROM EXISTING PETROLEUM TECHNOLOGIES AND FOSSIL FUEL PROCESSES ARE BEING CARRIED OUT. MAJOR MILESTONE: IDENTIFICATION OF SPECIFIC CLASSES OF COMPOUNDS INVOLVED IN MUTAGENIC POTENTIAL OF COMPLEX MATERIALS.

****PROJECT: 04238-PULMONARY CARCINOGENESIS TEST SYSTEM**

STARTING/ COMPLETION DATE : 01/76 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 83000
 TASK CODE=V625F-68 **EPA=D5-E681-AD ** (IAG) PRIOR FY76 / \$ 187000
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: RJ FRY US DOE DIV OF BIOL & MED RES
 WE KISIELESKI US DOE DIV OF BIOL & MED RES
 MILESTONES.... 07/78 -TERMINAL REPORT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-N-00423B SSIE-GMA 5354 EPA -D5-E681-AD TASK-V625F-68
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... A NUMBER OF BIOLOGICAL ACTIVE POLLUTANTS, IN PARTICULAR POLYCYCLIC HYDROCARBONS, ARE DIFFICULT TO ELIMINATE FROM THE EFFLUENTS OF THE VARIOUS TYPES OF PROCESSING PLANTS WHICH ARE EITHER NOW IN USE OR ARE PROPOSED. SOME OF THE POLYCYCLIC HYDROCARBONS ARE KNOWN PULMONARY CARCINOGENS BUT NEITHER THE PRECISE NATURE OF THE EFFLUENT CONTENT NOR THE CARCINOGENICITY OF ALL OF THE IDENTIFIED COMPOUNDS ARE KNOWN. THEREFORE THERE IS A NEED FOR APPROPRIATE, RAPID AND ECONOMIC METHODS OF ASSAY OF THE EFFLUENT CONTENT NOR THE CARCINOGENICITY OF ALL OF THE IDENTIFIED COMPOUNDS ARE KNOWN. THEREFORE THERE IS A NEED FOR APPROPRIATE, RAPID AND ECONOMIC METHODS OF ASSAY OF THE ONCOGENIC POTENTIAL OF COMPOUNDS AND FOR THE STUDY OF PULMONARY TUMORIGENESIS. THE OBJECTIVES ARE TO: (1) ESTABLISH APPROPRIATE TEST SYSTEMS FOR THE ASSESSMENT OF TUMORIGENIC POTENTIAL OF COMPOUNDS. (2) CARRY OUT THE EXPERIMENTS IN SUCH A WAY THAT INFORMATION ABOUT THE MECHANISMS OF SUSCEPTIBILITY INCLUDING THE RELATIONSHIP OF PROLIFERATION IS OBTAINED. (3) DETERMINE WHETHER PULMONARY CARCINOGENS ACT ADDITIVELY OR MULTIPLICATIVELY IN THE MOUSE. THE AIMS OF THE CURRENT WORK ARE: (1) TO ESTABLISH THE SPONTANEOUS PREVALENCE AND AGE-SPECIFIC MORTALITY RATES OF LUNG TUMORS IN BALB/C AND C57B1/6 MICE; (2) TO COMPARE THE TUMORIGENIC EFFECTS OF IN VITRO AND IN VIVO EXPOSURE TO BENZO(A)PYRENE; (3) TO TEST THE USE OF NUDE ATHYMIC MICE FOR TRANSPLANTS OF LUNG TISSUE FROM DIFFERENT SPECIES IN ORDER TO COMPARE SPECIES SUSCEPTIBILITY FOR TUMORIGENESIS. WE HAVE ESTABLISHED THE PREVALENCE AND MORTALITY RATES FOR LUNG TUMORS IN MALE AND FEMALE B6C1F AND ARE CURRENTLY COMPLETING THE STUDY OF PREVALENCE IN THE PARENT STRAINS C57B1/6 AND BALB/C. IT SHOULD NOW BE POSSIBLE TO DISTINGUISH INDUCTION AND ADVANCEMENT OF TIME OF APPEARANCE OF TUMORS AND WHETHER CARCINOGENS ACT ADDITIVELY.

****PROJECT: 04240-DEVELOPMENT OF PERMANENT EPITHELIAL CELL LINES**

STARTING/ COMPLETION DATE : 01/76 - 01/81 : FUNDING : ESTIMATED - FY77 / \$ 80000
 TASK CODE=V625F-69 **EPA=DR-E681-AD ** (IAG) PRIOR FY76 / \$ 135000
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: JK SELKIRK U.S. DEPT. OF ENERGY
 MILESTONES.... 07/78 -SEMI-ANNUAL PROGRESS REPORTS
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-N-004240 SSIE-GMA 5348 EPA -DR-E681-AD TASK-V625F-69
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... OBJECTIVES: (1) TO STUDY, DEVELOP AND UTILIZE IN VITRO CELL CULTURE TECHNIQUES WITH EPITHELIAL CELLS WHICH ARE MAJOR TARGET TISSUE FOR THE STUDY OF THE CARCINOGENIC AND TOXIC ACTIVITY OF CHEMICALS KNOWN TO BE ASSOCIATED AS BY-PRODUCTS OF NON-NUCLEAR ENERGY PRODUCTION SUCH AS THOSE PRODUCED DURING THE FORMATION OF SYNTHETIC FUELS AND OIL SHALE EXTRACTION. (2) TO DISCERN BY METABOLIC ACTIVATION STUDIES THOSE CARCINOGENS WHICH CELL CULTURES ARE MOST CLOSELY RELATED TO HUMAN METABOLISM FOR EXTRAPOLATION FROM LABORATORY RESULTS TO THE HUMAN POPULATION. APPROACH: THIS RESEARCH GROUP UTILIZES SEVERAL TYPES OF CHEMICAL CARCINOGENS TO STUDY THEIR METABOLIC ACTIVATION, DETOXIFICATION AND INTERACTION WITH CELLULAR GENETIC MATERIAL. THE MAJOR DIRECTION IS TO STUDY SALIENT DIFFERENCES BETWEEN SUSCEPTIBLE AND RESISTANT SPECIES AND TO UTILIZE THE KNOWN TISSUE PREFERENCES OF SEVERAL CHEMICAL CARCINOGENS TO UNCOVER CRITICAL DIVERGENCE IN THE METABOLIC ACTIVATION PATHWAYS. MILESTONE: WE HAVE DETERMINED MAJOR VARIANCE IN THE ENZYMATIC ATTACK ON BENZO(A)PYRENE BY NORMAL AND CHEMICALLY TRANSFORMED LIVER EPITHELIAL CELLS AND ATTRIBUTE THIS DIFFERENCE TO ALTERATION IN TRANSLATION OF THE DRUG METABOLIZING COMPLEX.

****PROJECT: 04242-INFLUENCE OF DIET ON THE GASTROINTESTINAL ABSORPTION OF CADMIUM**

STARTING/ COMPLETION DATE : 07/76 - 09/81 : FUNDING : ESTIMATED - FY77 / \$ 90000
 TASK CODE=V625F-70 **EPA=D5681-AP ** (IAG) PRIOR FY76 / \$ 202000
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: HE WALBURG UNIVERSITY OF TENNESSEE
 RJ CHERTOK UNIVERSITY OF TENNESSEE
 LB SASSER UNIVERSITY OF TENNESSEE
 MILESTONES.... 07/78 -SEMI-ANNUAL PROGRESS REPORT
 PLAN ID..... (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES... REC-N-004242 SSIE-GMA 5349 EPA -D5681-AP TASK-V625F-70
 AP -625F DU -N140 LABT-EMI

ABSTRACT..... WE HAVE PREVIOUSLY DEMONSTRATED THAT A RELATIONSHIP EXISTS BETWEEN LOW DIETARY CA AND THE UPTAKE OF ORALLY ADMINISTERED DOSES OF CD WHICH MAY BE FURTHER COMPLICATED BY ADVERSE CA:P RATIOS IN THE DIET. THE OBJECTIVE OF THIS STUDY WAS TO DETERMINE THE EFFECTS OF CD ON THE INTESTINAL ABSORPTION OF CA. MATURE RATS WERE ORALLY DOSED WITH 0, 50, 500, OR 5000 MICROGRAMS OF CD DAILY FOR 3 WEEKS. EVERTED GUT SACS FROM THESE RATS WERE PLACED IN MEDIA CONTAINING 4 X 10 TO THE MINUS 5TH POWER M CA, AND TISSUE UPTAKE AND TRANSPORT INTO THE SEROSAL FLUID OF THE SACS WERE MEASURED. TISSUE CONTENT OF CA AFTER 1 HOUR INCUBATION WAS EQUAL FOR THE 3 LOWER DOSES BUT WAS APPROXIMATELY 1.5 TIMES THE CONTROL VALUE FOR THE 5000 MICRON CD DOSE. SEROSAL FLUID CONTENT OF CA WAS DECREASED BY THE 500 AND 5000 MICROGRAM CD/DAY DOSES TO APPROXIMATELY 85 AND 80 PERCENT OF CONTROL. IN OTHER EXPERIMENTS, GUT SACS FROM CONTROL ANIMALS WERE INCUBATED FOR 1 HOUR IN BATHING MEDIA CONTAINING 4 X 10 TO THE MINUS 5TH POWER TO 1 X 10 TO THE MINUS 2ND POWER M CD. TISSUE AND SEROSAL FLUID UPTAKE OF CA DECREASED AS CD CONCENTRATION IN THE BATHING MEDIA WAS INCREASED. TO DETERMINE THE EFFECTS OF CD ON THE ACTIVE TRANSPORT OF CA, GUT SACS FROM 3-4 WEEK OLD RATS WERE FILLED WITH BATHING MEDIA CONTAINING 4 X 10 TO THE MINUS 5TH POWER M CA AND PLACED IN THE BATHING MEDIA WITH ADDED CD (1 X 10 TO THE MINUS 6TH POWER TO 1 X 10 TO THE MINUS 2ND POWER M). ACTIVE TRANSPORT OF CA WAS ABOLISHED BY 1.5 X 10 TO THE MINUS 4TH POWER M CD WHILE A CD CONCENTRATION OF 1 X 10 TO THE MINUS 6TH POWER M DECREASED THE TRANSPORT OF CA TO 1/3 THE CONTROL VALUE AFTER 2 HOURS INCUBATION. TO SUMMARIZE, INTESTINAL UPTAKE OF CA CAN BE INHIBITED BY CHRONIC INGESTION OF CD AS WELL AS BY ACUTE EXPOSURE OF

****PROJECT: 04244-TOXIC EFFECTS OF METALS ON DNA SYNTHESIS**

STARTING/ COMPLETION DATE : 07/75 - 07/78 : FUNDING : ESTIMATED - FY77 / \$ 0
 TASK CODE=V625F-71 **EPA-D5-E-681-AT ** (IAG) PRIOR FY76 / \$ 50000
 EPA OFFICER.: G RAUSA EPA/HQOTRS- OEMI
 INVESTIGATOR.: EF KORMAN UNIVERSITY OF CALIFORNIA
 JF WARD UNIVERSITY OF CALIFORNIA
 LS MYERS UNIVERSITY OF CALIFORNIA
 PLAN ID.....: (AP-625F)(DU-N140) AIR, WATER AND MULTI-ROUTE EXPOSURE & THEIR EFFECTS (HEALTH)
 ORDIS CODES...: RECN-004244 SSIE-GMA 5347 EPA -D5-E-681-AT TASK-V625F-71
 AP -625F DU -N140 LABT-EMI

ABSTRACT.....: OBJECTIVE: TO STUDY THE EFFECTS OF METALS IN FOSSIL FUELS ON THE SYNTHESIS AND/OR REPAIR OF DNA.
 APPROACH: EXPOSURE OF AN IN VITRO ENZYMATIC DNA SYNTHESIZING SYSTEM TO DIVALENT IONS OF THE METALS,
 MEASURING THEIR EFFECTS UPON: (1) THE RATE AT WHICH NEW DNA IS FORMED, AND (2) THE FIDELITY OF DNA
 SYNTHESIS, I.E., UPON THE INCORPORATION OF ERRORS INTO NEWLY FORMED DNA. PROGRESS: DIVALENT BARIUM,
 CALCIUM, COPPER, COBALT, NICKEL, CADMIUM, MERCURY, LEAD, AND ZINC HAVE BEEN SHOWN TO INCREASINGLY
 INHIBIT DNA SYNTHESIS IN THE ORDER LISTED IN THE IN VITRO SYSTEM. INHIBITION CAN BE COMPLETELY
 OVERCOME BY NON-ENZYMATIC PROTEIN AT 200 MICROGRAMS/ML. DNA PRIMER-TEMPLATE, ESSENTIAL IN THE
 ENZYMATIC SYSTEM, CAN ALSO OVERCOME THE INHIBITION WHEN PRESENT AT SUFFICIENTLY HIGH
 CONCENTRATIONS. DEOXYRIBONUCLEOSIDE TRIPHOSPHATES, ALSO ESSENTIAL IN THE ENZYMATIC SYSTEM, MODULATE
 THE INHIBITORY EFFECTS OF THE METAL IONS, GIVING A "MULTIPHASIC" PATTERN AT SUFFICIENTLY HIGH
 CONCENTRATIONS. CURRENT STUDIES: THE ABILITY OF METAL IONS TO INDUCE MISINCORPORATIONS OF BASE
 ERRORS INTO NEWLY FORMED DNA IS CURRENTLY BEING STUDIED IN THE IN VITRO SYSTEM. A PAPER REPORTING
 THIS WORK WILL BE PUBLISHED IN 1978.

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